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MICH.

EIGHTH ANNUAL REPORT

OF THE

SECRETARY

OF THE

STATE BOARD OF HEALTH

OF THE

STATE OF MICHIGAN,

FOR THE

FISCAL YEAR ENDING SEPT. 30, 1880.

MICHIGAN STATE BOARD OF HEALTH
SEAL.

BY AUTHORITY.

LANSING:
W. S. GEORGE & CO., STATE PRINTERS AND BINDERS.
1881.

Office of the Secretary of the State Board of Health,
Lansing, Michigan, December, 1880.

To Hon. CHARLES M. CROSWELL, *Governor of Michigan:*

Sir:—In compliance with the laws of this State, I present to you the accompanying Report for the fiscal year ending September 30, 1880.

Very respectfully,

HENRY B. BAKER,

Secretary of the State Board of Health.

DEC 5 '28 Minn. Hist. Soc. EXCHANGE U. OF M. DUPLICATE

RESOLUTION OF THE BOARD RELATIVE TO PAPERS PUBLISHED IN ITS ANNUAL REPORT.

Resolved, That no papers shall be published in the Annual Report of this Board except such as are ordered or approved for purposes of such publication by a majority of the members of the Board; and that any such paper shall be published over the signature of the writer, who is entitled to the credit of its production, as well as responsible for the statements of facts and opinions expressed therein.

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REPORT.

This is the EIGHTH Annual Report of the Secretary of the Michigan State Board of Health, and is for the fiscal year ending September 30, 1880. The first part of the volume, paged in Roman numerals, contains the Secretary's report of the work of the Board, the Secretary's report of property, which includes the additions to the Library, abstracts of proceedings at the meetings of the Board, and special reports, communications, etc. The second part of the volume contains forty-four addresses and papers on different sanitary subjects. Of these, twenty-three were presented at the Sanitary Convention held at Detroit, January 7 and 8, 1880, and thirteen were presented at the Sanitary Convention held at Grand Rapids, February 17 and 18, 1880. Of the remaining eight papers, one is by a member of the Board; three are by correspondents of the Board; one is printed by permission of the author, having been read before a meteorological society in England; three are compiled in this office from material furnished by the correspondents and meteorological observers of the Board, on blanks from this office. The articles on Meteorology of Michigan in 1879, and on Weekly Reports of Diseases in Michigan in 1879, are illustrated in a graphic manner by means of diagrams.

The papers are printed, as in previous Reports, under the following resolution:—

> "*Resolved*, That no papers shall be published in the Annual Report of this Board except such as are ordered or approved for purposes of such publication by a majority of the members of the Board; and that any such papers shall be published over the signature of the writer, who is entitled to the credit of its production, as well as responsible for the statements of facts and opinions expressed therein."

The names and postoffice addresses of members of the Board and the dates when their terms of office expire are as follows:—

ROBERT C. KEDZIE, M. D., President, Lansing, 1881.
EDWIN A. STRONG, A. M., Grand Rapids, 1881.
HON. LEROY PARKER, Flint, 1883.
REV. DANIEL C. JACOKES, D. D., Pontiac, 1883.
HENRY F. LYSTER, M. D., Detroit, 1885.
JOHN H. KELLOGG, M. D. Battle Creek, 1885.
HENRY B. BAKER, M. D., Secretary of the Board, and Superintendent of Vital Statistics, Office at Lansing.

STANDING COMMITTEES.

1. Epidemic, Endemic and Contagious Diseases,————.*
2. Sewerage and Drainage,—Henry F. Lyster, M. D.

---

*No appointment since the resignation of Homer O. Hitchcock, M. D., of Kalamazoo.

3. Food, Drinks, and Water Supply,—Robert C. Kedzie, M. D.
4. Buildings—Public and Private: Including Ventilation, Heating, etc.,—Rev. D. C. Jacokes.
5. Climate, Geology, Topography, and Vegetation in their Relations to Health,—Henry F. Lyster, M. D.
6. Disposal of Excreta and Decomposing Organic Matter,—John H. Kellogg, M. D.
7. Poisons, Explosives, Chemicals, Accidents, and Special Sources of Danger to Life and Health,—Robert C. Kedzie, M. D.
8. Occupations, Recreations, and Habits in relation to Health,—John H. Kellogg, M. D.
9. The Relations of Schools to Health,—Rev. D. C. Jacokes.
10. Sanitary Survey,—Rev. D. C. Jacokes, Hon. LeRoy Parker, and Henry B. Baker, M. D.
11. The Death-Rate as Influenced by Age, Climate, and Social Condition,—Henry B. Baker, M. D.
12. Legislation in the interests of Public Health,—Hon. LeRoy Parker.
13. Finances of the Board,—Hon. LeRoy Parker.
14. Mental Hygiene,————.*
15. Diseases of Animals in their Relation to Public Health,—Henry B. Baker, M. D.
16. The Relations of Preventable Sickness to Taxation,—John H. Kellogg, M. D.

WORK OF THE OFFICE OF THE BOARD, FISCAL YEAR, 1880.

The main items of work performed in the office may be grouped, as also may the work of the Board as whole, under three general heads as follows: The Collection of Information, the Coördination of such Information so as to lead to new knowledge, and the Dissemination of Information. The first includes the collection of the reports from the large number of health officers, clerks of local boards of health, meteorological observers, regular correspondents, and of special items of interest from every available source. The second group of actions includes the work of the office in assorting, tabulating, collating, and preparing the material thus collected, into systematically arranged records, or in papers for publication in the Reports of the Board, it being possible to attain new and valuable knowledge from this compilation and arrangement of facts. The Dissemination of Information calls for attempts to solve the problem how best to get the knowledge, prepared as suggested under the previous heads, before the people of the State for whom it is designed.

COLLECTION OF INFORMATION, FISCAL YEAR 1880.

ANNUAL REPORTS BY HEALTH OFFICERS FOR THE YEAR ENDING DEC. 31, 1879.

In January, 1880, a circular (36) which had been approved by the Board, was sent to the health officer of each township, city, and village in the State, 1,257 in all, transmitting to them the blank form [I] for their annual report to this Board, and also a blank for a copy of their record of cases of diseases dangerous to the public health which had been reported to them as occurring during the year.

The blank for a copy of the record of cases of diseases dangerous to the public health is printed, reduced in size, on page 278 of the Report of this Board for 1879.

---

* No appointment since the resignation of Homer O. Hitchcock, M. D., of Kalamazoo.

The number of reports on these blank forms received from health officers is stated in a tabular summary on page xii.

Circular 36 is as follows:—

[36.] OFFICE OF THE SECRETARY OF THE STATE BOARD OF HEALTH,
Lansing, Michigan, January, 1880.

To the Health Officer:

SIR,—Herewith I send you a blank form (I) for your use in making your annual report to this Board, required by law,* *for the year ending December 31, 1879.*

PLEASE FILL OUT AND RETURN THIS REPORT AS SOON AS POSSIBLE.

The blank form is somewhat similar to one sent to the clerk of your board, but your report should be made according to your best knowledge, leaving his report to be made by him according to his best knowledge. If each of you will report the cases reported to himself, we will then know the total number of cases reported, and to which class of officers the greatest number of reports are made; and if we have estimates of the probable number of cases not reported, made by two different persons in each locality, we may gain a good idea of the actual condition of the public health and of the public-health service in the different parts of the State. As soon as sufficiently accurate and complete reports are received from such a proportion of the localities as will be fairly representative, it is designed that they shall be compiled and published. Although many specific facts have been learned from the reports of those health officers who have made satisfactory reports, general truths concerning the entire State cannot well be reached by compilation of reports when only the best, or poorest townships of many counties are represented; it is therefore important that every health officer shall make a report. For a similar reason, *every blank should be filled.* If no sickness has occurred within your jurisdiction, or if there has been *no case* of any disease concerning which a report is asked, it is important to state that fact, and the reason, if known, for such healthfulness, and also the population, etc., in the blank spaces for those statements in the report. *It is also important to fill the blanks for the probable number of cases of diseases not reported to you.* It is necessary to have uniform blank forms, because it is impossible to compile from letters and postal cards, on account of the time required to search through them; and for this reason, every fact to which the report relates should be entered in its proper place in the report.

Your report should be made out *for the exact territory over which your board has jurisdiction,* and for which you are the health officer, and it *should not include* anything outside of such jurisdiction. A township board of health *does not have jurisdiction in an incorporated village,* even though such village be situated within the limits of the township. If you have been appointed health officer for a township and an incorporated village, it is necessary that you make separate reports for each, just as separate as if they were made by different persons.

Please ascertain and report, as completely as possible, the causes of all fires within your jurisdiction during the year 1879; also the number of lives lost, and of persons injured, in consequence thereof.

I send you a blank sheet for your Report of Cases of Diseases Dangerous to the Public Health. If you have any cases on your record, PLEASE FILL OUT AND RETURN THIS REPORT AS SOON AS POSSIBLE. If you have more cases to report than can be reported upon one side of a sheet (28), please write to this office for blanks, stating the additional number of sheets you need. If you have no case to report *please send a definite statement to that effect;* and whether you have cases recorded or not, *please state your belief as to the number of cases of each of such diseases that have occurred within your jurisdiction that have not been legally reported to you.* You will find blank spaces for this near the middle of the first page of the blank form (I).

The blank which I send for your report of Cases of Diseases is essentially the same form as the one several times recommended by this Board as a proper form for a record of such cases. For the purpose of beginning or continuing such a Record, you can obtain sheets, or books of sheets, similar to this one, except that they are for a Record instead of a report, of W. S. George & Co., Lansing, Mich., for eighty cents per quire or three dollars per hundred. If desired, the same dealers will bind them at usual prices. They will also supply, for one dollar per hundred, blank notices for the use of householders and physicians in complying with sections 1734 and 1735, compiled laws of 1871, and section 1740 of compiled laws of 1871, as amended by act No. 145, laws of 1879, which sections require householders and physicians, under liability to a fine for non-compliance, to report to the *local* board of health cases of diseases dangerous to the public health. In connection with these notices your attention is respectfully asked to act No. 157, laws of 1879, relative to duties of health officers of cities and villages. It is again recommended that your board of health have copies of these blank notices thoroughly distributed within your jurisdiction, in order to call attention to the law, and secure material for a complete record in your office, relating to diseases which endanger the public health.

---

* Act No. 81, Laws of 1873, Sec. 8. It shall be the duty of the health physician, and also of the clerk of the local board of health in each township, city, and village in this State, at least once in each year, to report to the State Board of Health their proceedings, and such other facts required, on blanks and in accordance with instructions received from said State Board. They shall also make special reports whenever required to do so by the State Board of Health.

It is not expected that it will always be possible, from the notices which you receive, to fill every column of your record; but so much as it is possible to learn concerning each case should be recorded and reported, because the single fact of the number of cases of sickness from each such disease will be of value in connection with the records of deaths and other knowledge collected at this office. It is hoped that you will not fail to record all cases of such diseases under your own care.

In case any disease should appear in your locality as an epidemic, please make a special report of the fact to this office as soon as possible. It is also expected that you will study and record the conditions coincident with the rise, progress, and decline of any such epidemic, and in due time report the same to this Board. Concerning every such occurrence, you should be able to report some facts which will be of use in advancing the cause of public health.

By direction of the State Board of Health.

Very respectfully,

HENRY B. BAKER, *Secretary.*

Plsase preserve and file the circulars which you receive from this office.

Blank form [I] is as follows:

[Before filling any blanks, please read carefully through the entire form, including foot-notes and instructions.]

[I.] ☞ DO NOT CHANGE OR MARK OUT ANY PRINTED MATTER ☜

To the Secretary of the State Board of Health: Sir,—This ANNUAL REPORT TO THE STATE BOARD OF HEALTH by the HEALTH OFFICER of the*----------------of----------------, County of ----------------, State of Michigan, FOR THE YEAR ENDING DECEMBER 31, 1879, consists of this form, with[a]-----------a Report of Cases of Diseases Dangerous to the Public Health,† which have occurred in this*---------------during the year above stated which is[b]----------sent herewith on------separate sheet--.

1. To the best of my knowledge and belief, the ratio of deaths (from all causes) to inhabitants in this*---------------during the year ending December 31, 1879, was[c]--------than the average of previous years.

2. The[d]-----------of the death-rate was probably due to--

3. I estimate the number of inhabitants in this*---------------at[e]------; and the number of deaths from all causes at[e]------.

4. The per cent of deaths to inhabitants, during the year ending December 31, 1879, was------.

5. Compared with previous years, the ratio of cases of sickness (from all causes) to inhabitants in this*---------------during the year ending December 31, 1879, was[c]--------than the average.

6. The[d]-----------of the proportion of sickness was probably due to--

7. The greatest number of the deaths was from the diseases or causes (named in the order of greatest number), as follows:--

8. The greatest number of cases of sickness was from diseases (named in the order of greatest prevalence), as follows:--

9. The number of deaths during the year ending December 31, 1879, from Diseases Dangerous to the Public Health† is as follows:‡

From small-pox,----------------------------deaths;
from cholera,----------------------------deaths;
from scarlet fever,----------------------------deaths;
from typhoid fever,----------------------------deaths;
from measles,----------------------------deaths;
from whooping-cough,------------------------deaths;
from cerebro-spinal meningitis,-------------deaths;
from diphtheria,----------------------------deaths;
from---------------, ----------------------deaths.

---

* Insert the word "township," "city," or "village."

† This is the term employed in the law. It includes all communicable diseases, whether epidemic, infectious, or contagious.

‡ In filling blanks followed by such words as "deaths," "cases," etc., numbers should be stated if possible, either in words or figures, and "0" should be written where that expresses the truth; for the reason that a *blank space indicates that the item has been overlooked*, and a dash should not be used in place of a cipher, because it is usually employed to indicate that a blank which should not be filled with a figure or letter has not been overlooked.

[a] If not sent, insert the syllable "out."

[b] If not sent, insert the word "not."

[c] Insert the word "greater," "less," or "the same," as the fact may be. If much greater or less, say so.

[d] Insert "increase" or "decrease," as the case may be.

[e] Insert the number in figures.

10. To the best of my knowledge and belief cases of Diseases Dangerous to the Public Health† have occurred within the jurisdiction of this board, during the year ending December 31, 1879, that have not been reported to me by the householder within whose family the case occurred, or by the physician in charge of said case, as follows:‡ (*These cases are included in the statement in paragraph 12, below.*)

Of small-pox,..............................cases;
of cholera,..............................cases;
of scarlet fever,..............................cases;
of typhoid fever, ...cases:
of measles, ...cases;
of whooping-cough,..............................cases;
of cerebro-spinal meningitis,..............................cases;
of diphtheria, ...cases;
of..............., ...cases.

11. The numbers of cases of diseases on my record, which I report at this time in detail on the blank for that purpose, are as follows:‡ [f]

Of small-pox,..............................cases;
of cholera,..............................cases;
of scarlet fever..............................cases;
of typhoid fever,..............................cases;
of measles, ...cases;
of whooping-cough,..............................cases;
of cerebro-spinal meningitis,..............................cases;
of diphtheria, ...cases;
of..............., ...cases.

12. Including the cases legally reported to me and those not so reported, the total number of cases of Diseases Dangerous to the Public Health,† which have occurred within the jurisdiction of this board, during the year ending December 31, 1879, were, to the best of my knowledge and belief, as follows:‡

Of small-pox, ...cases;
of cholera,..............................cases;
of scarlet fever,..............................cases;
of typhoid fever,..............................cases;
of measles,..............................cases;
of whooping-cough,..............................cases;
of cerebro-spinal meningitis,..............................cases;
of diphtheria, ...cases;
of..............., ...cases.

13. The date of the first case of each disease was as follows:

Of small-pox, ...18..;
of cholera,..............................18..;
of scarlet fever,..............................18..;
of typhoid fever,..............................18..;
of measles,..............................18..;
of whooping-cough,..............................18..;
of cerebro-spinal meningitis,..............................18..;
of diphtheria,..............................18..;
of..............., ...18..

14. The date of the last case was as follows:

Of small-pox, ...18..;
of cholera,..............................18..;
of scarlet fever,..............................18..;
of typhoid fever,..............................18..;
of measles,..............................18..;
of whooping-cough, ...18..;
of cerebro-spinal meningitis,..............................18..;
of diphtheria,..............................18..;
of..............., ...18..;

15. So far as known, the sources from which the diseases were derived were as follows:[g]

Of small-pox, ...;
of scarlet fever,..............................;
of measles, ...;
of cerebro-spinal meningitis,..............................;
of cholera,..............................;
of typhoid fever,..............................;
of whooping-cough, ...;
of diphtheria,..............................;
of..

16. I attribute the[h]..............................in this*..............., during the year ending December 31, 1879, to the following causes or circumstances:..............................
....

17. During the year ending December 31, 1879, the climatic conditions observed by me were as follows:..............................
....

18. So far as I can ascertain,............... fires have occurred in this*...............during the year ending December 31, 1879, from causes as follows:..............................
....,
and...............lives were lost and...............persons injured, in consequence thereof.[i]

19. During the year ending December 31, 1879, I have attended......meetings of this board of health, and the following measures were adopted in the interests of public health:..............................
....

---

[f] If there is absolutely no case to report, the blank form for cases need not be sent in as part of your report. But it is important to fill all the blanks after names of diseases on this form, with ciphers if that expresses the truth, to show that you have no case of each disease.

[g] After each disease insert the words "the disease was contracted in the city of...............," or "at the school in ....," "in a room occupied by persons sick with the same disease...............(time) since," "by means of clothing worn by patient with same disease," etc., etc., as the facts may be. In the case of typhoid fever, if the privy was near the well, or within the dwelling, state the facts.

[h] Insert the words "excessive mortality," "excessive sickness," "general healthfulness;" or otherwise express the facts.

[i] Please state whether any lamp explosion has occurred, and especially mention any injuries to persons thereby.

20. Cases of Diseases Dangerous to the Public Health† now prevail at time of completing this report as follows:

Of small-pox,..................................cases;
of cholera,..................................cases;
of scarlet fever,..................................cases;
of typhoid fever,..................................cases;
of measles,..................................cases;
of whooping-cough,..............................cases;
of cerebro-spinal meningitis,..................cases;
of diphtheria, ...cases;
of..................., ...cases.

21. In my opinion the principal sources of danger to life or health in this*.................., at the present time, are as follows:..

My P. O. address is..

I hereby certify that, to the best of my knowledge and belief, the statements in the foregoing report are correct.

Dated.........................., 1880.

Signed...,

*Health Officer of the**....................*of*......................

---

* Insert the word "township," "city," or "village."

† This is the term employed in the law. It includes all communicable diseases, whether epidemic, infectious, or contagious.

In the foregoing report, PLEASE FILL ALL BLANKS IN SOME WAY, TO SHOW THAT NONE HAVE BEEN OVERLOOKED.

Please answer the questions as they are printed, and in the blanks left for the purpose. *Do not change or mark out any of the printed matter.* If you wish to communicate any item which will not go in the blank as printed, please write on a separate sheet of paper.

ANNUAL REPORTS BY CLERKS OF LOCAL BOARDS OF HEALTH, FOR THE YEAR ENDING DECEMBER 31, 1879.

At the same time that Circular 36 was sent to the health officers, Circular 37, which had been approved by the Board, was sent to each clerk of a township, city, or village board of health, 1,257 in all, together with blank form [J] for their annual report to this Board, and the same blank for a copy of the record of diseases dangerous to the public health, as was sent to health officers. The Circular 37 and blank form [J], sent to clerks, are very similar to the Circular 36 and blank form [I] printed on pages ix.–xii., except that those sent to the health officers were more complete as regards the information asked concerning deaths and the causes of diseases. The number of reports received from clerks on these blanks is shown in the following summary:—

TABULAR SUMMARY.—*Number of Annual Reports on Forms [I] and [J], and Copies of Records of Cases of Diseases Dangerous to the Public Health, received from Health Officers and Clerks of Local Boards of Health, for the Year ending December 31, 1879.*

BOARD OF HEALTH.	ANNUAL REPORTS.			Copies of Records of Diseases Dangerous to the Public Health.		
	Total.	By Health Officers.	By Clerks.	Total.	By Health Officers.	By Clerks.
Total	1,116	574	542	598	278	220
Township	1,019	507	512	448	245	203
City	23	13	10	16	10	6
Village	74	54	20	34	23	11

This is 244 more annual reports and 199 more copies of records than were received for 1878.

Completion and Correction of Reports.

It has been necessary, as before, to correspond with some of the health officers and clerks in order to complete and correct some of the reports. To facilitate this correspondence essentially the same printed letters were used as are printed on page xiv. of the Report of 1878.

RETURN OF NAMES AND POSTOFFICE ADDRESSES OF HEALTH OFFICERS OF TOWNSHIPS, CITIES, AND VILLAGES.

In April, 1880, a circular (32) was sent to all the supervisors in the State, transmitting a blank form [E] and an addressed envelope for the return of the name and address of the health officer of the township, whom the law requires to be appointed within 30 days after the annual township meeting in April. The circular is the same (excepting the change of date) as was used in 1879, and is essentially the same as Circular 26, printed on pages xv.–xvi. of the Report for 1878. Form [E] is as follows:—

[Please fill every blank, by words or figures, or as directed in the foot-notes. Do not mark out any printed word.]

[E.]

To the Secretary of the State Board of Health, Lansing, Michigan:

SIR:—On the..................... day of...................., 188.., the Township, Board, being the Board of Health of the Township of...............................

County of..............................., State of Michigan, met for the transaction of business and....*appointed a Health Officer.

The name of the Health Officer of this township is...................................

His postoffice address is.................., County of..................., Michigan.

He†............a physician.

He†............the Supervisor of this township.

‡................., Supervisor of the township of....................;

P. O. Address: ....

‡...................., Township Clerk and Clerk of the Board of Health;

P. O. Address: ....

This return is made out by§...

Dated at............, this............day of..............., 188..

---

* If re-appointed, write "re-;" if not, draw a line.

† Insert the word "is," or "is not," as the case may be.

‡ It is not essential that more than one of the officers SIGN this return, but it is desirable to have the name and P. O. address of each. If either officer writes in the name of the other, this fact should appear on this return, so that the officer making the return may be known.

§ Insert the words "the Clerk," "the Supervisor," "the Clerk and Supervisor," or otherwise state the facts.

[Postage must be prepaid on this return, at letter rate.]

At the same time a circular (39) was sent to the mayor of each incorporated city and to the president of each incorporated village in the State, accompanied by a blank form [F] and an addressed envelope for the return of the name and address of the health officer. To guard against any loss of circulars through the mails and to make it more certain that the attention of the city or village council should be called to the subject, a copy of the circular and blank, also with an addressed envelope, was at the same time sent to the clerk or recorder of every city and incorporated village in the State.

Circular 39 is as follows:

[39]

OFFICE OF THE STATE BOARD OF HEALTH,
Lansing, Mich., April, 1880.

To the Mayor and Aldermen of the City, or the President and Council of the Village:

GENTLEMEN:—Your attention is respectfully asked to the general law relative to Boards of Health in this State, as amended by Act No. 56, Laws of Michigan, 1877, which amended section 1693, being section 2 of chapter 46, Compiled Laws of 1871. The amendment is such that, whereas before a health officer might be appointed by the board of health, it is now required that such officer shall be appointed; and if practicable he must be a physician. The amended law also requires that notice of such appointment shall be sent to the Secretary of the State Board of Health. The section as amended is as follows:—

> (1693.) Sec. 2. Every township board of health shall appoint and constantly have a health officer of the township who shall, where practicable, be a physician and sanitary adviser, and an executive officer of the board: *Provided,* That in townships where it is not practicable to secure the services of a well-educated and suitable physician, the board may appoint the supervisor or some other person as such health officer. The board of health shall establish his salary or other compensation, and shall regulate and audit all fees and charges of persons employed by them in the execution of the health laws and of their own regulations. Within thirty days after the annual township meeting in each year, the board of health shall meet for the transaction of business and shall appoint or reappoint a health officer, and shall immediately cause to be transmitted to the Secretary of the State Board of Health, at Lansing, the full name and postoffice address of such health officer, and a statement whether he is a physician, the supervisor, or some other person not a physician. A special meeting of the board may be called by the order of the president or of any two members of said board.

The amended section 1693 directly refers, as before, only to township boards of health; but section 1740 (section 49 of the same chapter) as amended in 1879, makes it apply to cities and villages. Section 1740, as amended by Act No. 145, laws of 1879, is as follows:—

> (1740.) Sec. 49. The mayor and aldermen of each incorporated city, and the president and council, or trustees of each incorporated village in this State, in which no board of health is organized under its charter, shall have and exercise all the powers and perform all the duties of a board of health as provided in this chapter, within the limits of the cities or villages, respectively, of which they are such officers. The provisions of this chapter, and the amendments thereto, shall, as far as applicable, apply to all cities and villages in this State, and all duties which are, by the provisions of this chapter, to be performed by the board of health of townships, or by the officers and inhabitants thereof, shall in like manner be performed by the board of health and the officers and inhabitants of such cities and villages, with a like penalty for the non-performance of such duties, excepting in cases where the charters of such cities and villages contain provisions inconsistent herewith.

In complying with the law please use the printed envelope and blank form (F) herewith transmitted, to return to this office the name of the physician whom your honorable body appoint, or have appointed, as your health officer. Have the kindness to add a statement of the time when his term of office will expire. In this blank, provision is made for reporting a health officer not a physician, although it is believed to be "practicable to secure the services of a well-educated and suitable physician" in every city and incorporated village in this State. Please have the fact whether the health officer is a physician stated in the return, as provided for in the blank form.

A return is expected from your corporation, even though some of the duties of a board of health are delegated to other persons than the Mayor and Aldermen, or President and Council, as the case may be. It is believed that the duty of making a return in accordance with section 1693 as lately amended, is not delegated, but is one of "the duties of a board of health as provided in this chapter" that must be performed by your honorable body in accordance with the general law hereinbefore referred to, namely section 1740 (Sec. 49, Chapter 46), Compiled Laws of 1871. If your charter contains such provisions as make it clear that this duty should be performed by some other body than your own, will you have the kindness to transmit this communication to that body, and to inform this Board of the fact?

The law requires that the local board of health shall "constantly have a health officer." If, by reason of the death, resignation, or removal of your health officer, another person shall be chosen to that office, it will facilitate our work if you will cause a notice of such change to be sent to this office.

The recent amended law relative to the Health Officer very properly requires that "The board of health shall establish his salary or other compensation." In one instance a person who acknowledged that he had been appointed Health Officer of a city has declined to report to this Board, giving as a reason that his appointment was simply nominal, that he received no compensation, and had taken no oath of office or in any way signified his acceptance of the office. This leads to the suggestion that the person whom you appoint, or have appointed, as your Health Officer be directed to take and subscribe the official oath required by Section I., Art. xviii., of the Constitution of this State, and file the same with the clerk of your corporation before the return of his name and address is made to this office, which the law requires to be done "immediately," and that in case his acceptance of the office be not thus signified, it should be considered that the office is not accepted, and another appointment be made.

The law practically requires local boards of health to do all that is required in the interest of public health (See sections 1692 to 1739, chapter xlvi, compiled laws of 1871); and also requires that the health officer shall be an executive officer of the local board (See section 1693, compiled laws of 1871, as amended by Act No. 56, laws of 1877). In addition to his services as an executive officer and as the sanitary adviser of your local board of health, the law requires that your health officer shall, at least once in each year, make a report to this Board, on blanks and in accordance with instructions received from this Board; also that he shall make special reports whenever required to do so by this Board. In connection with his other duties, he should be directed by your board to inquire into, study, and record the conditions coincident with the rise, progress, and decline of any outbreak of any communicable or preventable disease; and, besides making the local record, he should be prepared to make his report to this Board as valuable as possible. Any important sanitary experience of your board may, if thus reported, be made useful to the cause of public health throughout the State.

By direction of the State Board of Health.

Very Respectfully,

HENRY B. BAKER, *Secretary.*

Form [F.] is as follows:—

[Please fill every blank, by words or figures, or as directed in the foot-notes. Do not mark out any printed word.]

[F.]

To the Secretary of the State Board of Health, Lansing, Michigan:—

SIR:—The name of the Health Officer of this*.................is.................

....

His full postoffice address is................................, ...County of

...................................., Michigan.

He†.................a physician.

His term of office expires..

....

The person who is in fact the Health Physician of this*..........................

is entitled, by our charter:‡..

....

By direction of the§..

....

Signed,.., Clerk

of the*........................of..........................

Dated at..this..........................day of

...................................., 188..

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*Insert the word "city" or "village," as the case may be.

†Insert the word "is," or "is not," as the case may be.

‡Please insert the words: "Health Officer," "President of the Board of Health," or state that the Health Officer is appointed by your body and not mentioned in the charter; or otherwise convey knowledge of the facts as they may be.

§Insert the words "Mayor and Aldermen of the City of..................," or "President and Council of the Village of.........................;" or "Board of Health of the City (or village) of ....," if this return is not made by the Common Council.

[*If no other written matter than what is necessary to fill the blanks is sent with this, and the envelope containing it is left unsealed, it will pass through the mails for one cent.*] *

From some localities no return of the name of the health officer was received, and in June, 1880, a second demand was made by sending the same circulars to all delinquent townships, cities, and villages asking for such a return. The whole number of health officers finally returned for the year 1880 was as follows:

Health officers of townships	817
Health officers of cities	35
Health officers of villages	111
Total in the State	963

METEOROLOGICAL REPORTS.

Three hundred and twenty-seven monthly meteorological registers have been received during the year, all on blanks supplied from this office, a copy of which, reduced in size, is printed on page 216 of the Report for 1878.†

Records of meteorological observations have also been received from the health departments of several cities outside the State, in connection with the mortality statements acknowledged in the Secretary's annual report of property on following pages. A statement of meteorological instruments, furnished during the year to observers for this Board, will be found in the Secretary's annual report relative to property on following pages of this Report.

The names and localities of observers in the State, and the months for which registers have been received from them from the beginning of their reports to to this Board up to the close of the fiscal year 1880, are stated in a tabular list on pages xvii–xviii. The statements of registers received include both months named.

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* Since then the ruling of the Postoffice Department requires postage to be paid on these returns at full letter rates

† The directions for taking observations and for care of instruments, which are printed on the back of the blanks for meteorological registers, were printed on pages xxxv-xxxix of the Report for 1875, but have since been somewhat amended.

Names of Observers, and Months for which Meteorological Reports have been Received from them, to September 30, 1880.

NAME OF OBSERVER.	LOCATION.	MONTHS FOR WHICH REGISTERS HAVE BEEN RECEIVED.
Upper-Peninsular Division:		
J. T. O'Keefe, Sergt. Sig. Corps, U. S. A.	Marquette, Marquette Co.	July and Sept. to Dec., 1879.
J. Gilligan, Sergt. Sig. Corps, U. S. A.	Marquette, Marquette Co.	Jan. to June, and Aug., 1879, and Jan. to Sept., 1880.
Rev. A. W. Bill	Menominee, Menominee Co.	Oct., 1878, to Nov., 1879.
L. A. Welch, Sergt. Sig. Corps, U. S. A.	Escanaba, Delta Co.	Jan. to July, 1880.
Chas. Dill, Sergt. Sig. Corps, U. S. A.	Escanaba, Delta Co.	Aug. and Sept., 1880.
A. B. Simonson, M. D.	Minong, Isle Royale, L. S.	Dec., 1879, to April, 1880, Sept., 1880.
North-Western Division:		
Carroll E. Miller, M. D.	Cadillac, Wexford Co.	June to Sept., 1879.
H. T. Calkins, M. D.*	Fyfe Lake, Gr'd Traverse Co.	Jan., 1875, to Dec., 1877.
Northern Division:		
Dr. A. M. Gerow	Cheboygan, Cheboygan Co.	Nov., 1878.
H. T. Calkins, M. D.*	Petoskey, Emmet Co.	Jan., 1878, to May, 1880.
North-Eastern Division:		
James A. Barwick, Sergt. Sig. Corps, U. S. A.	Alpena, Alpena Co.	Jan., 1879, to April, 1880, June to Sept., 1880.
J. S. Foy, Private, Sig. Corps, U. S. A.	Alpena, Alpena Co.	May, 1880.
J. E. Fair	Harrisville, Alcona Co.	Sept. to Nov., 1879, Jan. to Sept., 1880.
James S. Reeves, M. D.†	East Tawas, Iosco Co.	Feb., 1876, to April, 1877, except Sept., 1876.
Western Division:		
S. C. Emery, Sergt. Sig. Corps, U. S. A.	Grand Haven, Ottawa Co.	Jan. to Nov., 1879.
D. P. Waters, Corp'l Sig. Corps, U. S. A.	Grand Haven, Ottawa Co.	Dec., 1879.
Geo. R. Hancock, Sergt. Sig. Corps, U. S. A.	Grand Haven, Ottawa Co.	Jan. to Sept., 1880.
Lee S. Cobb,‡	Nirvana, Lake Co.	Nov., 1873, to March, 1880.
E. S. Richardson,‡ M. D.	Reed City, Osceola Co.	April to Sept., 1880.
M. Veenboer, M. D.	Grand Rapids, Kent Co.	July to Sept., 1880.
Bay-and-Eastern Division:		
W. O. Bailey, Sergt. Sig. Corps, U. S. A.	Port Huron, St. Clair Co.	Jan., 1879, to Sept., 1880.
J. S. Caulkins, M. D	Thornville, Lapeer Co.	Dec., 1876, to Sept., 1880.
Central Division:		
I. N. Mitchell	Hastings, Barry Co.	Sept., 1879, to June, 1880.
Fred. Sweet	Hastings, Barry Co.	July to Sept., 1880.
J. J. Grafton, Warden State House of Correction	Ionia, Ionia Co.	May, 1879, to Sept., 1880.
Prof. R. C. Kedzie	Agricultural College, Lansing.	Oct., 1875, Feb., 1876, Jan., 1877, to Oct., 1879.
A. W. Nicholson, M. D.	Otisville, Genesee Co.	May, 1877, to Sept., 1880.
Office State Board of Health	Lansing, Ingham Co.	Oct., Nov., 1878, Jan., 1879, to Sept., 1880.
Lee S. Cobb‡	Winfield, Ingham Co.	May to Sept., 1880.
South-Western Division:		
Henry F. Thomas, M. D.	Allegan, Allegan Co.	Nov., 1875, to Dec., 1876.
John Bell, M. D.	Benton Harbor, Berrien Co.	Nov., 1875, to April, 1879, July, 1879, to Sept., 1880.
James S. Reeves, M. D.†	Niles, Berrien Co.	June, 1877, to Sept., 1880.
Southern-Central Division:		
Jacob Breedon	Adrian, Lenawee Co.	Aug., 1879, to Sept., 1880.
J. H. Kellogg, M. D.	Battle Creek, Calhoun Co.	Jan., 1876, to Sept., 1880.
Lyman P. Alden, Supt. State Public School	Coldwater, Branch Co.	Oct., 1875, to Sept., 1880.
E. H. Van Deusen, M. D., Supt. Asylum for Insane	Kalamazoo, Kalamazoo Co.	Dec., 1875, to Jan., 1877.
Geo. C. Palmer, M. D., Supt. Asylum for Insane, (A. M. Munn, observer)	Kalamazoo, Kalamazoo Co.	Feb., 1877, to Sept., 1880.
Edwin Stewart, M. D.	Mendon, St. Joseph Co.	Jan., 1877, to Sept., 1880.
Dr. E. Hause	Tecumseh, Lenawee Co.	Dec., 1875, to Sept., 1877.
Harrison Peters, M. D.	Tecumseh, Lenawee Co.	Oct., 1877, to Sept., 1880.
C. M. Woodward, M. D.	Tecumseh, Lenawee Co.	March and April, 1876.
Frank P. Cook	Three Rivers, St. Joseph Co.	July and Aug., 1879.
Lewis Marvill	Parkville, St. Joseph Co.	May to Sept., 1880.
Prof. L. McLouth, State Normal School	Ypsilanti, Washtenaw Co.	Dec., 1875, to March, 1880, May, June, Aug., and Sept., 1880.
A. G. Gumaer§	Hudson, Lenawee Co.	Oct., 1879, to Feb., 1880.
Lieut. A. H. Boies	Hudson, (Mallory Lake), Lenawee Co.	March to Sept., 1880.
A. G. Gumaer§	Marshall, Calhoun Co.	April to Sept., 1880.

Names of Observers—Continued.

NAME OF OBSERVER.	LOCATION.	MONTHS FOR WHICH REGISTERS HAVE BEEN RECEIVED.
F. D. Parmelee	Hillsdale, Hillsdale Co.	Jan. to Sept., 1880.
G. W. Babbitt	Jackson, Jackson Co.	May to Sept., 1880.
Prof. M. W. Harrington, University of Michigan	Ann Arbor, Washtenaw Co.	Jan. to Sept., 1880.
SOUTH-EASTERN DIVISION:		
C. Henri Leonard, M. D.	Detroit, Wayne Co.	Dec., 1875, to Feb., 1879.
Theo. V. Van Heusen,[‖] Sergt. Sig. Corps, U. S. A.	Detroit, Wayne Co.	Dec., 1875, to March, 1879.
C. F. R. Wappenhaus,[‖] Sergt. Sig. Corps, U. S. A.	Detroit, Wayne Co.	March, 1879, to Sept., 1880.
F. W. Higgins, Supt. Woodmere Cemetery	Detroit, Wayne Co.	Jan., 1876, to March, 1880.
L. G. Gorton	Detroit, Wayne Co.	Sept., Oct., Nov., 1879, Feb., 1880.
Wm. C. West, M. D.	Monroe, Monroe Co.	Feb., March, April, May, Sept., Oct., 1876, Jan. to July, 1877, March to Aug., 1878.
H. W. Downing	Monroe, Monroe Co.	Nov. and Dec., 1878, Mar., 1879.
Albert Yates, M. D.	Washington, Macomb Co.	Sept., 1878, to Sept., 1880.
T. J. Langlois, M. D.	Wyandotte, Wayne Co.	July and Aug., 1879.

[*] Removed from Fyfe Lake to Petoskey.

[†] Removed from East Tawas to Niles.

[‡] Lee S. Cobb removed from Nirvana to Winfield. E. S. Richardson, M. D., continues the observations, at Reed City, a point eleven miles east from Nirvana.

[§] Removed from Hudson to Marshall.

[‖] Also furnishes monthly summaries.

REGULAR CORRESPONDENTS.

During the year, 14 new correspondents have, by their agreement and by vote of the Board, been added to the official list. The whole number at the close of the year is 154.The following named articles in this Report are based on material contributed by some of these correspondents: Diseases in Michigan in 1879; Weekly Reports of Diseases in Michigan in 1879.

Reports of Diseases in Michigan in 1879.

In reply to Circular 38 relative to diseases in 1879, 29 correspondents made reports. The circular is printed on pages 223–241, the questions alternating with summaries of the replies received. The summaries were made in the office of the secretary. The replies are printed on pages 243–262.

Weekly Reports of Diseases in Michigan in 1879.

This important means of collecting useful information has been successfully maintained during the fiscal year 1880. A compilation of the weekly reports for the calendar year 1879 is printed in this volume, beginning on page 365.

BOOKS AND PERIODICALS.

A list of books and periodicals received by gift, purchase, or exchange during the year, with the names of the donors, may be found in the secretary's report of property, on following pages of this first part of this Report.

COMPILATION OF MATERIAL COLLECTED.

Inasmuch as our correspondents and meteorological observers do their work gratuitously, it is the aim of the Board to make the labor necessary in completing and sending in their weekly reports and meteorological registers as light as possible and still secure correct and valuable reports. To the correspondents who send weekly reports of diseases, addressed postal card blanks* are sent, on which they make their reports; a blank record is also furnished in which they can record cases and keep a copy of their reports which they send to this office. The work of compiling, tabulating, and arranging for publication the results obtained from the thousands of weekly reports received during the year entails a vast amount of labor in this office, but it is gratifying to know that great progress is being made in knowledge essential to an enlightened public health service. The meteorological observers deserve great credit for their faithfulness and the great interest manifested (in many instances) by their unbroken line of observations. We do not ask them to compute any averages, monthly sums or means, or deductions from the original observations, all that work as also the work of computing the relative and absolute humidity, and of reducing the barometric readings to the freezing point (correcting for differences in temperature), etc., being performed in this office, except where, as is sometimes the case with observers for the United States signal service, the observer can copy computations made for other purposes.

A compilation of meteorological conditions at different stations in Michigan during the calendar year 1879 is printed on pages 303–363 of this volume.

The replies from correspondents in reply to the circular relative to diseases in Michigan in 1879 are arranged alphabetically by divisions of the State. A list of the sanitary divisions of the State, with the counties in each division, is given on page 227 of this Report.

Another branch of work in the office of the secretary is the supervision of the printing of the reports, circulars, and other documents issued by the Board. Proof on all printed matter is carefully read and compared with the manuscript copy, and every caution taken to prevent errors.

DISSEMINATION OF INFORMATION.

The methods adopted for placing before the people the information collected by this Board are believed to be the best that can be adopted under the present law. The results of study in any especial direction, or the compilation of any particular set of facts, are printed either in the Annual Reports, in circulars, or in smaller documents published by the Board. The number of copies of the Annual Report for each year printed is 5,900; of that number only 3,500 are distributed by this Board, 2,050 are distributed by the State Department the same as are the Joint Documents, 200 are allowed the State Department for miscellaneous distribution, and 150 are supplied to the librarian of the State Library for exchanges. From the 3,500 allowed this Board for distribution, the health officers of townships, villages, and cities, and the clerks and presidents of the village and city boards of health should be supplied. Did each township, city, and village return a health officer, this would take 1,698 copies, or nearly one-half the whole number to be distributed by this Board. The whole number printed (5,900) is not enough to supply one copy to each officer and member of a local board of health. The law directs that copies may be distributed to "persons interested in or laboring for the promotion of the cause of public health." In distributing the Reports of this Board to the officers of local boards of health, the volumes are wrapped and addressed to the officer for whom each is intended, and all the books going to one county are sent to the clerk of that county for distribution to the persons for whom they are designed, who are notified by this office to call for the book at the office of the county clerk. To many of the officers who live some distance from the county seat it is inconvenient, and in many cases expensive, to call for the book, and the clerks of counties do not all forward the books to the township clerk for distribution; hence in quite a number of cases the volumes remain uncalled for, not so much from lack of interest in the subject of which they treat as from the faulty method of distribution. In order to ascertain whether prominent citizens of the State care enough for the Annual Reports of this Board to be at some little trouble or expense to get them, and more especially to supply the Report to such as wished it, a letter was sent to each of the presidents of villages in the State and to the mayors of fourteen cities not county seats, as follows:

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* A copy of the weekly-report blanks, with a specimen filling, is printed on page 368.

OFFICE OF THE SECRETARY OF THE STATE BOARD OF HEALTH,
LANSING, MICHIGAN, September, 4, 1880.

DEAR SIR—The Annual Report of the State Board of Health for 1879, and the Eighth Registration Report, being a compilation and study of the Vital Statistics of Michigan for the year 1874, are now being distributed. According to previous custom, they would go to the county clerk's office, and remain until called for by you. It is believed that in many instances this is very inconvenient, and, if you wish, I will send the Reports to you direct by express, or I will send them to the county clerk, as you may direct. I am informed by the agent here that the expense to you for the express charges will be 25 cents. Please reply at once on the enclosed postal card, and state your wishes and your name and official address. If I do not hear from you at all I shall consider that you are not particularly interested in the subject, and as the number of Reports printed is not large, none will be sent for you. If you desire them, however, I shall be only too glad to place them in your hands by either of the above methods.

Awaiting your reply, I am, sir, very respectfully,

HENRY B. BAKER, Secretary.

In response to this letter thirty-one presidents of villages and one mayor of a city requested that the books be sent for them to the county clerk, while seventy-one presidents of villages and four mayors of cities requested that the books be sent by express at their expense, preferring to pay the cost rather than be to the trouble to get the books from the office of the county clerk. The volumes should be sent by mail or express direct to the persons for whom they are intended; thus far this Board has not had means sufficient to do this.

Desiring to know the number of Reports of this Board for each year in the hands of the officers of local boards of health, a blank was prepared and sent at the same time other documents were sent out, to the health officers of townships, cities, and villages, and to the clerks and presidents of cities and villages, asking them to state the number of copies of the Report of this Board for each year in their hands. To the health officers and presidents and clerks of city and village boards of health, the blank was sent out with the copy of the Report for 1878, through the county clerk, and of course all those not calling for the Report would not come into possession of the blank. The blank for clerks of townships were sent with circular 37, asking for their annual report. The fact that the postage on these returns had to be paid at the expense of the sender probably lessened the number of returns. The fact that officers for one year who remove from the locality or are not reëlected do not always turn over the Reports in their possession to their successors in office, must also be remembered. The number of copies of the Annual Reports of this Board for each year in the hands of several officers as indicated by the returns received is shown in the following exhibit:

EXHIBIT I.—*The Number of Copies of the Annual Reports of the Michigan State Board of Health in the Possession of Officers of Local Boards of Health, as Indicated by Returns Made to this Board by Officers of Local Boards of Health.*

NAMES OF OFFICERS.	Annual Reports for							Number of Officers Reporting.
	1873.	1874.	1875.	1876.	1877.	1878.	All Years.	
Health officers of cities	1	2	2	3	5	13	26	16
Presidents of city boards of health	2	1	2	2	1	8	16	8
Clerks of city boards of health	1	5	2	4	8	10	30	11
Health officers of villages	7	3	5	13	16	44	88	45
President of village boards of health	1	1	3	1	6	24	36	28
Clerks of village boards of health	4	5	6	6	11	50	62	33
Health officers of townships	37	55	51	84	142	277	646	311
Presidents of township boards of health	1	2	......	1	2	4	10	5
Clerks of township boards of health	199	216	201	285	262	333	1496	401
Total	253	290	272	399	453	743	2410	858

No return was asked from presidents of township boards of health, but two or three made replies on blanks designed for other officers. It will be seen that the Reports which are in the libraries in the hands of the clerks are turned over to the successors in office much more than those in the hands of the other officers. The returns represent only about one-third of the total number of officers. An effort will be made to put the volumes of the Report now in the hands of the County Clerks in the libraries and in the hands of officers entitled to receive them.

CIRCULARS AND SMALLER DOCUMENTS.

The circular relative to "Notices of Diseases Dangerous to the Public Health" (34), and the one relative to the "Duties of Health Officers and of Local Boards of Health" (35), which were reprinted from the Report of the Board for 1879, have been distributed as opportunities have been presented, as have also the documents on "Restriction and Prevention of Scarlet Fever," and on "Restriction and Prevention of Diphtheria," and on "Prevention and Restriction of Small-pox," the editions of which documents are now nearly exhausted.

REPORT OF THE SECRETARY RELATIVE TO PROPERTY, ETC., FOR THE FISCAL YEAR ENDING SEPTEMBER 30, 1880.

To the President and Members of the Michigan State Board of Health:

GENTLEMEN:—In compliance with section 5 of Article II. of the by-laws of this Board, the following report of the "nature and amount of property belonging to the Board, which has been received, issued, expended, and destroyed since the last report, and of the property remaining on hand, and also in whose care each item of property is intrusted," is respectfully submitted:

For an account of the instruments and articles of a similar nature, which were on hand at the time of making the last report, you are respectfully referred to pages xii.–xv. of the Third, xxvii.–xxxi. of the Fourth, xl.–liv. of the Fifth, xxxv.–xlviii. of the Sixth, and xix.–xliii. of the Seventh Annual Report of this Board. Since that time articles of this class have been purchased as follows:

1 Standard Barometer.
3 Psychrometers.
4 Rain-gauges.
1 Zinc Oiler.
1 Call Bell.

Meteorological Instruments have been placed as follows:—

PSYCHROMETERS (one each) in the care of—
F. D. Parmelee, Hillsdale,
Lee S. Cobb, Winfield,
A. G. Gumaer, Marshall,
G. W. Babbitt, Jackson.

BAROMETERS (one each) in the care of—
J. J. Grafton, Ionia,
Edwin Stewart, M. D., Mendon.

RAIN GAUGES (one each) in the care of—
Prof. L. A. McLouth, Ypsilanti.
A. G. Gumaer, Marshall.
Lee S. Cobb, Winfield.
G. W. Babbitt, Jackson.
F. D. Parmalee, Hillsdale.

The psychrometer in the hands of Rev. A. W. Bill, of Menominee, at the time of making the last report has been returned, as has also the barometer loaned to Dr. A. W. Nicholson, of Otisville.

The barometer, psychrometer, and rain gauge used by Lee S. Cobb, at Nirvana, were, on his removal from that place to Winfield, turned over to Dr. E. S. Richardson, of Reed City, who continues the observations.

The psychrometer in the hands of W. C. West, M. D., of Monroe, being broken, one was paid for by that gentleman, to take the place of the one broken. It is placed with G. W. Babbitt at Jackson.

The plates illustrating the circular on the treatment of the drowned have been returned by C. L. Chamberlain, M. D., Secretary of the Connecticut State Board of Health.

The psychrometer and rain gauge at Hudson were, on the removal of A. G. Gumaer, placed in the care of Lieut. A. H. Boies, who continues the observations.

The psychrometer and rain gauge at Hastings have been placed with Sweet & Upjohn, because of I. N. Mitchell's removal to Grand Rapids.

Two bulbs for a psychrometer have been furnished to Lewis Marvill, of Parkville, to replace those broken on the psychrometer while in the hands of Frank P. Cook of Three Rivers. Mr. Marvill also has the rain gauge, and furnishes copies of his observations.

Books and other publications have been received and placed in the library of the Board during the year, or previously (by gift) and not heretofore acknowledged, as follows:

BY PURCHASE:—

Encyclopædia Britannica, a Dictionary of Arts, Sciences, and General Literature. Ninth edition, Vols. X, G-Got., and XI., Gon.-Hip.

Brain-Work and Overwork. Wood.

Eyesight, and How to Care for it. Harlan.

Hearing, and How to Keep it. Burnett.

Long Life, and How to Reach it. Richardson.
The Mouth and the Teeth. White.
The Throat and the Voice. Cohen.
Winter and its Dangers. Osgood.
The Summer and Its Diseases. Wilson.
Our Homes. Hartshorne.
Sea Air and Sea-Bathing. Packard.
Diphtheria; its Nature and Treatment, Varieties, and Local Expression. Mackenzie.
Hygiene and Education of Infants; or how to take care of the Babies, translated by Geo. E. Walton, M. D.
Water-Analysis for Sanitary Purposes, with hints for the interpretation of results, by Frankland.
Potable-Water. How to form a judgment on the suitableness of water for drinking purposes. Charles Ekin.
A course of Elementary Instruction in Practical Biology. New edition. Huxley and Martin.
Eighth Annual Report of the Local Government Board, 1878-79. Supplement containing the Report of the Medical Officer for 1878.
U. S. Official Postal Guide, 1880.
Detroit Lancet, 1880.
Sanitary Engineer, 1880.
The Sanitarian, 1880.
London Practitioner, 1880.
Nature, 1880.
Library Journal, 1880.
Index Medicus, 1880.
London Lancet, 1880.
Sanitary Record, 1880.
American Journal of Medical Sciences, 1880.
Medical News and Abstract, 1880.
Medical Record, New York, 1880.
Quarterly Returns of Births and Deaths, July, Aug., and Sept., 1879, and of Marriages April, May, and June, 1879, England. No. 123; Births and Deaths Oct., Nov., and Dec., 1879, and Marriages July, Aug., and Sept., 1879, No. 124. Eyre and Spottiswoode.

BY GIFT, EXCHANGE, ETC.:*

From Addicks, John E.:—

Health Officer's Annual Report of Births, Marriages and Deaths for the city of Philadelphia, Pa. 1879.

From Alden, L. P.:—

Diagnosis of Ringworm of the Head. By Alder Smith, M. B., Reprinted from the London Lancet.

From Allen, Jno. K.:—

A few thoughts about the home. By J. Harvey Lyon, M. D.
Alphabetical Hints on your Health. Reprint from Ladies' Sanitary Association, London, England.
Contamination of Drinking Water by Filtration of Organic Matter through the soil. By V. C. Vaughan, M. D.
Fifteen cent dinners for working men's families, by Juliet Corson.
Healthy Homes for Rich and Poor. 1879. Reprinted from the Sanitary Engineer.
Prospectus of the Association for the Promotion of Food Production by Women, in England.
Food Culture. Reprinted by Permission from the "Englishwoman's Review," 15th March, 1880.
Restriction of Diphtheria. Reprint from the Lansing Republican, Dec. 2, 1879.
By-Laws of the Delaware State Board of Health.
Sanitary Work in Lansing, Michigan. An extract from the message of William Van Buren, Mayor, to the Common Council, May 3, 1880. Also a List of the Secretaries of State Boards of Health in the U. S.
Table showing the Comparative Values of United States and European Currencies.
The Sanitary Arrangements of Dwellings. Illustrated. Printed for the Dublin Sanitary Association by permission of the British Medical Association.
The Use of Household Filters for Potable Waters. By Albert B. Prescott, M. D., F. C. S.

From American Statistical Association:—

Twenty-third and Twenty-fourth Annual Reports upon the Births, Marriages, and Deaths in the City of Providence, for the years 1877 and 1878.
Fifteenth Annual Report of the Board of State Charities of Massachusetts, to which are added the reports from its departments. With an Appendix. January, 1879.

[* Documents intended for the Library of the Board may be addressed: LIBRARY OF THE STATE BOARD OF HEALTH, LANSING, MICHIGAN.]

Eighth, Ninth, and Tenth Annual Reports of the Bureau of Statistics of Labor. Massachusetts. 1877, 1878, and 1879.

Circular of Information from U. S. Bureau of Education No. 3, 1879. The Value of Common School Education to Common Labor, by Dr. Edward Jarvis of Dorchester, Mass.

From Ames, Jr., M. D., Azel:

Privies and Water-Closets at Railway Stations, by H. O. Hitchcock, M. D. Reprinted from Seventh Annual Report of the Michigan State Board of Health, 1879. Also copies for distribution.

From Andrews, L. F.:

Report of the Sanitary Committee of the Iowa State Board of Health on Diphtheria.

From Angell, Pres. J. B.:

University of Michigan. The President's Report to the Board of Regents for the year ending June 30, 1879.

From Ashley, Ferd A.:

Diphtherie. Ein Zirkular betreffs Einschrankung und Verhuetung dieser gefaehrlichen Krankheit. Issued by the East Saginaw Board of Health.

Diphtheria and other Contagious Diseases. Their Restriction and Prevention. Issued by authority of the State Board of Health, and Reprinted by order of the Board of Health of East Saginaw for free distribution, 1879.

From Atwater, M. D., H. H.:

Death-rates of cities and towns in the United States for the year 1879.

Annual Reports of the Health Officer of the city of Burlington (Vt.), January 1, 1879, and January 1, 1880.

From Baker, M. D., Henry B.:—

"Average number of Children to a Mother." Reprint of pages 41, 42, 43, and 44, from Vital Statistics of Michigan, 1874.

From Ballou, M. D., Nahum E.:—

Investigation of Diseases of Swine, and Infectious and Contagious Diseases Incident to other classes of Domestic Animals, 1879.

From Becker, Dr. K.:—

Monatshefte zur Statistik des Deutschen Reichs fur das Jahr 1877. Herausgegeben vom Kaiserlichen Statistichen Amt. Band XXV. Juni, Juli, August, September, Oktober, November, und Dezember, Heft 6, 7, 8, 9, 10, 11, und 12. Fur das Jahr 1878, Band XXX. Januar, Februar, Marz, April, Mai, Juni, Juli, August, September, Oktober, November, und Dezember, Hefts 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, und 12. Fur das Jahr 1879, XXXVII, Januar, Februar, Marz, April, Mai, Juni, Juli, August, September, Oktober, November, und Dezember, Hefts 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, und 12. Fur das Jahr 1880, Band XLIII., Januar, Februar, und Marz, Hefts 1, 2, und 3.

Statistiches Jahrbuch fur das Deutsche Reich. Herausgegeben vom Kaiserlichen Statistischen Amt. Erster Jahrgang, 1880.

From Benjamin, Ph. B., M.:—

Writings of the Graduates in the Course of Analytical and Applied Chemistry, Columbia College. Supplement.

From Billings, M. D., John S.:—

Manual for Army Cooks. Compiled from the Report of a Board of Officers.

From Boardman, M. D., C. H.:—

Transactions of the Minnesota State Medical Society, 1880.

From Bohmerl, Dr. Victor:—

Kalender und Statistisches Jahrbuch, fur das Konigreich Sachsen nebst Marktverzeichnissen fur Sachsen und Thuringen auf das Jahr, 1880.

Zeitschrift des K. Sachsischen Statistischen Bureau's. Band XXIV. Jahrgang 1878, Heft III. und IV.

Zeitschrift des K. Sachsischen Statistischen Bureau's XXV. Jahrgang, 1879. Heft I. und II.

From Brewer, Hon. M. S.:—

Hygienic and Medical Reports by Medical Officers of the U. S. Navy. Prepared for publication under the direction of the Surgeon-General of the Navy by Joseph B. Parker, A. M., M. D., Surgeon, U. S. N. IV., 1879.

From Bulkley, M. D., L. Duncan:—

On the use of Water in the Treatment of Diseases of the Skin. Bulkley. Reprinted from the Chicago Medical Journal and Examiner, January, 1880.

From Bureau of Education of the U. S., Hon. John Eaton:—

Circulars of Information of the Bureau of Education. No. 1, 1879, Training Schools for Nurses; No. 2, 1879, Papers, Addresses, Discussions, and other Proceedings of the Department of Superintendence of the National Educational Association, at the meeting held at Washington, D. C., Feb. 4, 5, and 6, 1879; The Proceedings of the Department of Superintendence of the National Education Association, 1877; and the Proceedings of the conference of the Presidents and other delegates of the State Universities and State Colleges of Ohio, for 1877; No. 4, 1879, Training Schools of Cookery;

No. 5, 1879, American Education as described by the French Commission to the International Exhibition of 1876.

Correspondence from Andrew D. White, Minister to Berlin, Wm. Evarts, Secretary of State, Carl Schurz, Secretary Department of the Interior, and John Eaton, Commissioner of Education, Relative to Sale of Diplomas.

From Burton, M. D., G. W.:—

Proceedings of the Tri-State Medical Society (Indiana, Illinois, and Kentucky), 1878.

From Cabell, M. D., J. G.:—

Annual Report of the Board of Health of the Births, Marriages, and Deaths in the City of Richmond, for the year 1879.

From Carr, Joseph B.:—

An Act entitled "An Act to regulate the licensing of physicians and surgeons." New York.

From Caulkins, M. D., John S.:—

Methods of Study in Sanitary Science. Read at the Sanitary Convention at Detroit, Mich., 1880. Reprinted from the Annual Report of the Michigan State Board of Health for the year 1880.

From Chadwick, M. D., James R.:

A proposed act to regulate the practice of medicine in Massachusetts, for the protection of the Community.

A printed letter accompanying the proposed act to regulate the practice of medicine in Mass., and asking for suggestions to the same.

From Chamberlain, M. D., C. W.:—

Second Annual Report of the State Board of Health of the State of Connecticut for the fiscal year ending November 31, 1879, with the Registration Report, 1878, Relating to Returns of Births, Marriages, Deaths and Divorces. 1880.

Circular No. 5. Suggestions on Rural Hygiene, Relating Principally to the House and its Surroundings. For Local Boards of Health, local authorities and householders. Issued by the Connecticut State Board of Health.

The Connecticut State Board of Health. Sanitary Reports, Mortality in October and Nov., 1879.

Color Blindness. Act of Legislature requiring examinations. Rules and Requirements of the State Board of Health.

From Chancellor, M. D., C. W.:—

Third Biennial Beport of the State Board of Health of Maryland, January, 1880.

From Chandler, Prof. C. F.:—

Report on Petroleum as an illuminator, and the advantages and perils which attend its use; with special reference to the prevention of the traffic in dangerous Kerosene and Naphtha. Chandler.

From Chief Signal Officer, U. S. A.:—

Annual Report of the Chief Signal Officer to the Secretary of War, for the year 1879.

From Collamore, M. D., George A.:—

Annual Report of the Board of Health of the City of Toledo, Ohio. For the year 1879.

From Collett, John:

First Annual Report of the Department of Statistics and Geology of the State of Indiana, 1879.

From Commissioner of Agriculture of the U. S.:

Department of Agriculture. Special Report No. 20. Report upon the condition of the crops, December 1, 1879.

From Craig, C. E., W. F.:

The Sewerage System of Detroit. A paper read before the Sanitary Convention at Detroit, Michigan, 1880. Reprinted from the Annual Report of the Michigan State Board of Health for the year 1880.

Crossman, Daniel L.:

Report of the Joint Committee of the Michigan Legislature, of 1879, on alleged mismanagement and matters connected therewith in the Michigan Asylum for the Insane at Kalamazoo; also a supplemental report of the Senate Committee relating to the same subject, together with so much of the testimony taken as relates to the abuse of patients while in said asylum.

Cutting, Dr. Hiram A.:

Reports to the Legislature of Vermont, relating to the Registry and Returns of Births, Marriages, and Deaths, for the years 1858, 1869-1874.

Report of the Geologist and Curator of the Vermont State Cabinet for 1874 and 1875, with directions for collecting specimens, and an Address on Parasitic Insects of Domestic Animals.

Report of the Geologist and Curator of the Vermont State Cabinet, for 1875 and 1876, with some suggestions and directions as to how we may protect ourselves against Insect Enemies.

Meteorological Tables and Climatology of Vermont, with map showing the Rainfall; also, Suggestions and Directions about foretelling storms.

An Address upon Farm Pests, including Insects, Fungi, and Animalcules, delivered at a meeting of the New Hampshire Board of Agriculture by Hiram A. Cutting, A. M., M. D.

Vermont Medical Journal, Vol. I., No. II., March, 1874.

Microscopic Revelations: FUNGI.—Rust, Smut, Mildew and Mould. Animalcules—Water Mites, Sugar Mites, and Trichina Spiralis. An Address. Also a report of the condition of the Vermont State Cabinet of Natural History for 1877 and 1878.

From David, M. D., A. H.:—

Report of the Sanitary State of the City of Montreal for the year 1878. By A. B. LaRocque, M. D., Health Officer.

From Earle, M. D., Charles W.:—

The Cinchona Cure for Intemperance. Earle. Reprinted from the Chicago Medical Journal and Examiner, February, 1880.

From Elder, M. D., E. S.:—

Annual Report of the Board of Health of the City of Indianapolis for the year 1879.

Problems in Relation to the Prevention of Disease. Annual Address of J. R. Weist, A. M., M. D., President of the Indiana State Medical Society, session of 1880.

Report of the Indiana State Health Commission, Mortality Tables, etc. Reprinted from the Report of the Bureau of Statistics for 1879. Annual Report of the Board of Health of City of Indianapolis, for the year 1879.

Transactions of the Indiana State Medical Society, 1880. Thirtieth Annual Session.

From Fisher, M. D., A. W.:—

Report of Regular Monthly Session of Toledo, O., Board of Health for February 6, 1880.

From Fisher, M. D., Chas. H.: —

Second Annual Report of the State Board of Health of the State of Rhode Island for the year 1879.

Twenty-sixth Report upon the Births, Marriages, and Deaths in the State of Rhode Island for the year ending December 31, 1878.

From Fitzsimmons, Col. W. C.:—

A short address "To the People of Tecumseh, Michigan," from the Local Committee on Public Health, "A Card for Putting in Privies," "Save Your Families," etc.

From Foster, W. E.:—

Second Annual Report of the Librarian of the Public Library for the year ending February 3, 1880 [Providence, R. I.]

From Fraser, M. D., H. D.:—

Transactions of the South Carolina Medical Association, 30th Annual Session, held in Columbia, S. C., April 20th and 21st, 1880.

From Geddings, M. D., W. H.:—

Report of the Results of Thirty-one Cases of Phthisis Treated at Aiken, S. C., during the season of 1878–1879, by W. H. Geddings, M. D.. Reprinted from the Medical Record, November 15th, 1879.

Hints for Invalids Visiting Southern Health Resorts, by W. H. Geddings, M. D., of Aiken, S. C., reprinted from "Archives of Medicine," December, 1879.

From Gerhard, C. E., Wm. Paul:—

Annual Report of the Health Commissioner of the City of St. Louis for the fiscal year 1879-80.

From Gold, T. S.:—

Thirteenth Annual Report of the Secretary of Connecticut Board of Agriculture, 1879-80. Annual Report of the Conn. Agricultural Experiment Station for 1879.

From Goss, M. D., Francis W.:—

Medical Communications of the Massachusetts Medical Society. Vol. XII.—No. V.—1879.

From Gower, Hon. C. A.:—

Forty-second and Forty-third Annual Reports of the Superintendent of Public Instruction of the State of Michigan, with accompanying documents, for the years 1878 and 1879.

Outline of Institute Work for the use of Instructors in the Michigan Teachers' Institutes, 1879-1880.

The General School Laws of Michigan, with forms for Proceedings, 1879.

From Hamilton, M. D., Jno. B.:—

Annual Reports of the Supervising Surgeon-General of the Marine-Hospital Service of the United States for the fiscal years 1876 and 1877, and for 1878 and 1879.

From Hargis, M. D., Robt. B. S:—

Letter to Dr. J. C. Le Hardy, on Yellow Fever and the National Board of Health.

Hargis' Origin of Yellow Fever. Letters by Drs. Chaille and Hargis to the Editor of the *Pensacola Advance.*

Letters to the Editor of the Pensacola Advance, relative to the origin of yellow fever. Chaille and Hargis.

Practical Hints relating to yellow fever prevention. Reprinted from the "Independent Practitioner," July, 1880.

The ship-origin of Yellow Fever, with comments on the preliminary report of the Havanna Yellow Fever Commission. (From Gaillard's Journal, published in New York, June, 1880.)

From Harris, M. D., Elisha:—

An Act to establish a State Board of Health in the State of New York. Passed May 18, 1880.

An Act to amend chapter four hundred and eighty-two of the laws of 1875, entitled "An act to confer on Boards of Supervisors further powers of local legislation and administration, and to regulate the compensation of Supervisors. Passed May 29, 1880. Relativo to Registration of Vital Statistics in New York.

Circular from the N. Y. State Board of Health to Boards of Supervisors and others, relative to the registration of vital statistics.

Circular from N. Y. State Board of Health to Local Boards of Health relative to organization.

Seven forms issued by the New York State Board of Health for the following purposes: Birth Return; Return of Still-Birth; Report of a Death; Report of a Death filled out as a sample; Burial Permit; Transit of Body Permit; Certificate of Marriage.

From Harrison, Thos. L.:—

The Journal of the New York State Agricultural Society, Vol. XIX. No. 7. July 1869. Containing Prof. James Law's Report on Glanders.

From Harvey, M. D., Thos. W.:—

Rural Hygiene, by Charles F. Wingate, Sanitary Tract No. 1. Citizens' Health Association of the Oranges, Bloomfield and Montclair.

Suggestions Concerning the Sanitary care of Premises, by James C. Bayles, Sanitary Tract No 2, from the same Association.

From Hatch, M. D., F. W.:—

Fifth Biennial Report of the State Board of Health of California for the years 1878 and 1879.

Circular of the State Board of Health of California Relative to Small-Pox and Vaccination.

From Herrick, M. D., L. C.:—

Annual Report of the Secretary of State of Ohio, including the Statistical Report to the General Assembly for the year 1878.

From Herrick, M. D., S. S.:—

Annual Report of the Board of Health of the State of Louisiana to the General Assembly for the year 1879. Session of 1880.

Rules and Regulations of the Board of Health of the State of Louisiana for the government of quarantine officers and stations, and for the enforcement of the acts of the Legislature of Louisiana "establishing and regulating quarantine for the protection of the State;" also, Sanitary rules of the Board of Health of the State of Louisiana regulating shipping in the port of New Orleans.

From Hersey, M. D., Geo. D.—

Transactions of the Rhode Island Medical Society for the years 1877-1879, Volume II., Part Second.

Fiske Fund Prize Essays. The Causation of Typhoid fever, by Geo. E. Waring, Jr.; Artificial feeding of Infants, by Oliver C. Wiggin, M. D.; and Cholera Infantum: Its Causes, Nature and Treatment, by Charles Edward Banks, M. D.

From Hinrichs, Dr. Gustavus:—

Reports of the Iowa Weather Service for the months of May to December, 1879, and January to September, 1880.

From Holt, Hon. H. H.:—

Nature, Prevention and Cure of Diphtheria. Document issued November 10, 1879, by the Board of Health of the City of Muskegon, Michigan.

From Hunt, M. D., Chas. O.:—

Transactions of the Maine Medical Association, 1879. Vol. VI. Part III.

From Hunt, M. D., Ezra M.:—

Third Annual Report of the Board of Health of the State of New Jersey, 1879.

From Hunt, M. D., James G.:—

Fourth Annual Report of the Board of Health of the city of Utica, N. Y., Comprising Remarks on Sanitary Requirements, with Returns of Births, Marriages and Deaths for the year ending December 31, 1879.

From Ibach, B. F.:—

First Annual Report of the Board of Trustees of the Asylum for Feeble-minded Children; also of the Soldiers' Orphans' Home, for the year ending October 31, 1879. Knightstown, Indiana.

From Janssens, Dr. E.:—

Ville de Bruxelles. Rapport fait au Conseil Communal, en seance du 7 Octobre, 1878, par le College des Bourgmestre et Echevins.

Conseil Superior D'Hygiene Publique. Hygiene des Ecoles. Rapports faits au nom d'une commission du Conseil Superior D'hygiene Publique, par M. le Docteur E. Janssens, Membre de ce conseil.

Ville de Bruxelles. Annuaire de la Mortalite ou Tableaux Statistiques des Causes de Deces et du mouvement de la population, par le Docteur E. Janssens. 1877, 16e Anne; and 1878, 17e Anne.

Ville de Bruxelles. Annuaire demographique et tableaux statistiques des Causes de Deces. Par le Docteur E. Janssens. 1879, 18e Anne.

Ville de Bruxelles. Rapport fait au Conseil Communal en seance du 6 Octobre 1879. Par le College des Bourgmestre et Echevins. 1879.

Etude sur les causes nosologiques des deces dans le Ville de Bruxelles (1864–66). Par le Docteur E. Janssens.

Recherches Statistiques sur la Mortalite dans la Ville de Bruxelles, repartie par Rues et par Impasses (1864–1865–1866) avec l'indication du tribut mortuaire preleve par les six epidemics de cholera Asiatique (1832 a 1866), par le Docteur E. Janssens, 1868.

From Jennings, M. D., R. G.:—

Transactions of the State Medical Society of Arkansas, at its Fifth Annual Session (1880).

From Johnston, M. D., Wirt:—

Report of the Mississippi State Board of Health for the years 1878–79.

Sanitary Rules and Regulations of the Mississippi State Board of Health. Suggestions in regard to General Sanitation, Disinfection, and Deodorants. Adopted April, 1880.

An Act to Amend the Statutes in regard to Boards of Health, approved March 4, 1880. Published by order of the Mississippi State Board of Health.

From Jones, H. M.:—

Nineteenth Annual Report of the Cincinnati Hospital, for the fiscal year ending December 31, 1879.

From Kato, Hiroyuki:—

University of Tokio, Japan. The Calendar of the Departments of Law, Science, and Literature, 2539–40 (1879–80).

From Keating, J. M.:—

A History of the Yellow Fever. The Yellow Fever epidemic of 1878 in Memphis, Tenn., embracing a complete list of the dead, the names of the doctors and nurses employed, names of all who contributed money or means, and the names and history of the Howards, together with other data, and lists of the dead elsewhere.

From Kennedy, M. D., Stiles:—

Restriction and Prevention of Diseases which endanger the Public Health. Duties of Householders and Physicians. Kennedy.

Rules and Regulations adopted May 21, 1879, by the Board of Health of St. Louis, Michigan.

From Kirchner, Hon. Otto:—

Annual Report of the Attorney General of the State of Michigan for the year 1879.

From Knapp, W. H. H.:—

Regulations to Restrict and Prevent the Spread of Diphtheria, Scarlet Fever, and other Contagious Diseases, issued by the Board of Health of Riley Township, Clinton Co., Michigan, Nov. 5, 1878.

From Le Duc, Gen. Wm. G.:—

Letter to Hon. Benjamin Le Fevre, relative to the Department of Agriculture, U. S. A.

From Le Hardy, M. D., J. C.:—

National Sanitation. Reprint from the Transactions of the Medical Association of Georgia, 1880.

From Lindsley, M. D., Charles A.:—

The Seventh Annual Report of the Board of Health of the City of New Haven. 1879.

From Lindsley, M. D., J. Berrien:—

Transactions of the Medical Society of the State of Tennessee, at its forty-seventh Annual Meeting. 1880.

Third Report of the Board of Health of the City of Nashville, for the two years ending December 31, 1878.

From Logan, A. M., M. D., J. H.:—

Students' Manual of Chemico-Physics, in Three Parts. *Part First.* Chemico-Physics and Meteorology.

From Lord, Hon. Henry W.:—

Sanitary Rewards and Punishments. A paper read before the Sanitary Convention at Detroit, Michigan, 1880. Reprinted from the Annual Report of the Michigan State Board of Health for the year 1880.

From Lundy, M. D., C. J.:—

Light in the Public Schools, and School-Life in Relation to Vision. A paper read before the Sanitary Convention at Detroit, Michigan, 1880. Reprinted from the Report of the Michigan State Board of Health for the year 1880.

From Means, M. D., T. A.:—

Circular No. 3. The Board of Health of the State of Alabama.

The Book of the Rules of the Medical Association of the State of Alabama.

From Meares, M. D., J. L.:—

Report of the Health Officer of the city and county of San Francisco, for the fiscal year ending June 30, 1879.

From Meyer & Co., Henry C.:—

Supplement to Illustrated Catalogue of Henry C. Meyer & Co., New York. Sanitary Specialties.

From McKinnon, P. S.:—

Address to the "People of Tecumseh, Michigan," relative to the prevalence of Diphtheria, and measures for its prevention.

From McLeod, M. D., K.:—

Report concerning the health of Calcutta during the fourth quarter of 1879.

Annual Report and Returns Regarding the Health of the town of Calcutta during the year 1879.

Report of the Health of Calcutta for the second quarter of 1880.

From McMaster, M. D., H. S.:—

Transactions of the State Eclectic Medical and Surgical Society of Michigan, 1879.

From Michigan State Board of Health:—

Annual Reports of the Secretary of the State Board of Health of the State of Michigan for the years ending September 30, 1876, 1877, 1878, and 1879.

Circulars announcing Sanitary Conventions at Detroit, January 7 and 8, and at Grand Rapids, February 17 and 18, 1880.

Program of the Sanitary Convention at Detroit, January 7 and 8.

Circular 34, relative to Notices of Diseases which endanger the public health; duties of householders, physicians, and others. Circular from the State Board of Health of Michigan to supervisors and other officers of townships, to presidents and other officers of incorporated villages, and to mayors and other officers of cities.

Circular 35, to Health Officers, relative to the work of health officers and of local boards of health in Michigan. Issued by the State Board of Health of Michigan.

Circular 36 (to Health Officers, transmitting blank for annual report); Circular 37 (to Clerks, transmitting blank for annual report); Blank forms [I] and [J]; Blank for record of diseases dangerous to the public health; Printed Letter No. 3, relative to Weekly Reports of Diseases.

An Ordinance of the city of Lansing, regulating the recording and compilation of Vital Statistics.

Reprints from the Seventh Annual Report of the Michigan State Board of Health for the year 1879, as follows: No. 51, A Historical Review of Legislation relating to the Inspection of Illuminating Oils in Michigan. Annual Address of the President. By Robert C. Kedzie, M. D.

No. 52. Privies and Water-Closets at Railway Stations. By H. O. Hitchcock, M. D.

No. 53. Public Health Meetings. Report of Proceedings of the Sanitary Council of the Mississippi Valley, of the Section on State Medicine and Public Hygiene of the American Medical Association, and of the Meeting of the National Board of Health, in Atlanta, Georgia, by R. C. Kedzie, M. D..

No. 54. Regulation of the Practice of Medicine. By Hon. LeRoy Parker.

No. 55. Methods of Heating and Ventilating Private Dwellings and Public Buildings already constructed. By Rev. D. C. Jacokes, D. D.

No. 56. Report on Slaughter-Houses, Rendering-Establishments, etc. By H. O. Hitchcok, M. D.

No. 57. Sanitary Asssociations. By John H. Kellogg, M. D.

No. 58. Report on Diphtheria and other Communicable Diseases, Including Communications by Several Correspondents. By H. O. Hitchcock, M. D.

No. 59. Opinions Relative to Duties and Compensation of a Health Officer; On Questions Submitted by the Health Officer and Board of Health of Grand Rapids. By Hon. LeRoy Parker, G. Chase Godwin, and Hon. Otto Kirchner.

No. 60. Relative to the Diseases in Michigan during the year 1878, including a summary for the State, and the Replies by Correspondents of the State Board of Health to a circular on this subject issued by the Board.

No. 61. The Reclaiming of Drowned Lands. By Henry F. Lyster, M. D.

No. 62 The Water-Supply of Localities in Michigan and its relations to Health and Disease in some of the Townships, Cities, and Villages throughout Michigan.

No. 63. The Powers and Duties of Local Boards of Health. By Hon. LeRoy Parker.

No. 64. Report on Glanders in Man and in Domestic Animals. By Henry B. Baker, M. D.

No. 65. The Principal Meteorological Conditions in Michigan during the year 1878.

No. 66. Concerning Weekly Reports of Diseases in Michigan during the year ending December 28, 1878.

No. 67. Regulations for Examinination in Sanitary Science by the Michigan State Board of Health.

From Minor, M. D., Thos. C.:—

Thirteenth Annual Report of the Health Department of the City of Cincinnati, for the year 1879, two copies.

From Moore, Robert:—

Annual Report of the Board of Public Improvements of the City of St. Louis, for the fiscal year 1879-1880.

From Myer, General Albert J.:—

Annual Reports of the Chief Signal Officer to the Secretary of War for the years 1875, 1876, and 1878.

From Nagle, M. D, John T.:

Summary of Births, Marriages, Still-Births, and Deaths, etc., in New York City. Compared with 352 American and Foreign Cities. For the year 1878. And also the Mortality from some of the most prominent causes which took place in New York City during the past 75 years.

Summary of Births, Marriages, Still-Births, and Deaths in New York City during the year 1879.

Table showing the Births, Marriages, Still-Births, and Deaths reported to have occurred in the city of New York during the year ending December 31, 1879, with an enumeration of the most prominent causes of death, and meteorological observations.

Blank form for returning the number of Births, Marriages, Still-Births and Deaths, etc., in a city during 1879.

Epitome of the Births, Marriages, Still-Births, and Deaths in New York City during the year 1879.

From Neal, M. D., Thos. L.:—

Thirteenth Annual Report of the Board of Health of the city of Dayton, Ohio, for the year ending February 29, 1880.

From Neat, M. D., W. A.:

Articles on the Water Supply of Elkhart, Indiana.

From New Orleans Auxiliary Sanitary Assoeiation:

Report of the Committee on Construction and Management of Privies, made to the executive committee of the N. O Auxiliary Association April 17, 1880.

From Newton, M. D., Wm. K.:

State Board of Health of New Jersey, Circular A, as to Milk Supply.

From Nipher, Prof. Francis E.:

Report on Magnetic Determinations in Missouri, Summer of 1879. Nipher.

From North Carolina Medical Journal:

Census of the City of Wilmington, N. C., 1879.

From North, M. D., S. W.:

National Water-Supply [England] Congress, Tuesday and Wednesday, 21st and 22d May, 1878. Health and Sewage of Towns. Conference Thursday and Friday, 23d and 24th May, 1878.

1879, City of York [England], Report of S. W. North, Esq., Medical Officer of Health on Lodging-Houses.

From Oldright, M. D., Wm.:—

Eleventh Annual Report of the Inspector of Asylums, Prisons, and Public Charities for the Province of Ontario, for the year ending 30th September, 1878.

Report on the Adulteration of Food, being Supplement No. III. to the Report of the Department of Inland Revenue. 1876.

Report of the Meteorological Service of the Dominion of Canada by the Superintendent, to which are appended the Reports of the Directors of the Magnetic and other Observatories for the calendar year, 1877.

Transactions of the Canada Medical Association. Tenth Annual Meeting, 1877, Vol. I.

The Ontario Medical Register: printed and published under the direction of The Council of the College of Physicians and Surgeons of Ontario.

From Parker, Thomas A.:—

The Principles of Ventilation. Read before the Sanitary Convention at Detroit, Mich., 1880. Reprinted from the Annual Report of the Michigan State Board of Health for the year 1880.

From Park, M. D., J. P.:—

First Annual Report of the City Physician of Knoxville, East Tennessee, for 1874.

Annual Report of the City Physician and Registrar of Vital Statistics of Knoxville, East Tennessee, for 1875, 1876, 1877.

From Payne, M. D., Arthur J.:—

Report of the Health Officer of Calcutta, for the third quarter of 1879.

From Pierson, Rev. J.:—

Twenty-third Annual Report of the Water Commissioners of the City of Troy, N. Y., for the fiscal year 1879.

From Pietra Santa, Dr. Prosper de:—

Les Hospices Marins les ecoles de rachitiques conference faite le 23 Juillet, 1878, au Palais du Trocadero, par M. le Dr. de Pietra Santa.

Hygiene and Education de la Premiere Enfance.

Prospectus of the Societe Francaise D'Hygiene Fondee a Paris, Le 7 Mai, 1877.

From Playter, M. D., Edward:—

Playter's Elementary Anatomy, Physiology and Hygiene for use of Schools and Families.

From Porter, M. D., Joseph Y.:—

Proceedings of the Florida Medical Association, Session of 1879.

From Prescott, M. D., F. C. S., Prof. Albert B.:—

Poisons: Their Effect and Antidotes.

From Randall, Dr. I. E.:—

An ordinance Relative to the Appointment and duties of the City Physician of West Bay City.

From Ranney, M. D., Geo. E.:—

Transactions of the Michigan State Medical Society for the year 1879.

From Rauch, M. D., John H.:—

The Sanitary Problems of Chicago, Past and Present. An Introductory Address, Sept. 25, 1877.

From Reeve, M. D., J. T.:—

Fourth Annual Report of the State Board of Health of the State of Wisconsin, 1879.

Our School Houses, by Prof. T. W. Chittenden; Our Public Schools in their relations to the health of pupils, by J. T. Reeve, M. D. Reprints from the Fourth Annual Report of the Wisconsin State Board of Health.

Suggestions for the Restriction and Prevention of Diphtheria. Presented by the State Board of Health of Wisconsin. Third Edition.

Memorial of the State Board of Health to the Legislature of Wisconsin for the passage of a law regulating the inspection, sale, and use of illuminating oils.

State of Wisconsin. In Senate. No. 69, S. Jan. 29, 1880. A bill regulating the inspection, sale, and use of illuminating oils from petroleum and other sources.

State of Wisconsin. In Senate. No. 60, S. with amendments. A bill to provide for the inspection of illuminating oils.

Transactions of the Wisconsin State Medical Society for the year 1879, with its constitution and by-laws, and a list of its members. Vol. XIII.

From Regester, M. D., W. G.;

Transactions of the Medical and Chirurgical Faculty of the State of Maryland. Eighty-first annual session. Held at Baltimore, Md., April, 1879.

From Rezner, M. D., W. B.:—

City of Cleveland. A report of the Health Department of the city of Cleveland, Ohio, for the year ending December 31, 1879.

From Robbins, M. M.:—

Annual Reports of the City Officers of Aurora, Ills., for the year ending February 29, 1880; containing of the report of the Board of Health.

From Row, Hon. Sam'l H.:—

Tenth Annual Report of the Commissioner of Insurance of the State of Michigan. Year ending December 31, 1879.

From Russell, M. D., Jas. B.:—

Remarks by Medical Officer to accompany Mortality Tables of the City of Glasgow for the quarters ending June 30, 1879, September 30, 1879, December 31, 1879, and for the whole year 1879; for the quarter ending March 31, 1880.

From Russell, M. D., M. W.:—

Proceedings of the N. H. Medical Society at its eighty-ninth annual session, held at Concord, June, 1879.

From St. Louis, Mo., Public School Library:—

The Mayor's Message, with accompanying documents, to the Municipal Assembly of the City of St. Louis, at its regular session, May, 1880.

Twenty-fifth Annual Report of the Board of Directors of the St. Louis Public Schools, for the year ending August 1, 1879.

First Annual Report of the Bureau of Labor Statistics for the year ending January 1, 1880, Missouri.

From Saviers, Q. M. Gen., L.:—

Report of the Quartermaster General of the State of Michigan for the year 1879.

From Schaufuss, Dr. L. W.:—

Das Museum Ludwig Salvator in Ober-Blasewitz bei Dresden.

From Secretary of the Massachusetts State Board of Health:—

Eleventh Report of the State Board of Health of Massachusetts, for the six months ending June 30, 1879.

From Secretary of the State Board of Health, Lunacy, and Charity, of Massachusetts:—

First Annual Report of the State Board of Health, Lunacy, and Charity, of Massachusetts, to which is added a compilation of the statutes under which the Board performes its duties. January, 1880.

First Annual Report of the Board of Health, Lunacy, and Charity, of Massachusetts, 1879. Supplement containing the Report and Papers on Public Health.

From Secretary of State of Michigan:—

Eighth Annual Report relating to Births, Marriages and Deaths in Michigan, for the year 1874.

Acts of the Legislature of the State of Michigan, passed at the regular session of 1867. Vol. I.

First Annual Report of the Secretary of State of the State of Michigan relating to farms and farm products, 1878-9.

Seventeenth Annual Report of the Secretary of the State Board of Agriculture of the State of Michigan for the year ending August 31, 1878.

Joint Documents of the State of Michigan for the year 1878. Vols. I., II., and III.

Journal of the Senate of the State of Michigan, 1879. Vols. I. and II.

Journal of the House of Representatives of the State of Michigan, 1879. Vols. I. and II.

Local Acts of Michigan. Session of 1879.

Public Acts and Joint and Concurrent Resolutions of the Legislature of the State of Michigan, passed at the Regular Session of 1879. With an appendix, containing the State Treasurer's Annual Report for the year 1878.

Report of the State Inspector of Illuminating Oils of the State of Michigan for the six months ending December 31, 1879.

Contract Prices for doing the Printing and Binding, and for furnishing News print and Book Paper and Stationery for the State for the years 1880 and 1881.

From Seguin, M. D., E.:—

Metric Note No. 7 (*). To the British Medical Association.—Seguin.

Metric Note No. 10; Metric Campaign of 1879.

From Sekell, A. C.:—

Report of the City Surveyor on Additional Water Supply for the City of Grand Rapids, June, 1880.

From Sensai, Negayo:—

First and Second Annual Reports of the Central Sanitary Bureau of the Home Department of the Imperial Japanese Government, embracing the period from the 1st day of the 7th month of the eighth year of Meiji (1st July, 1875) to the 30th day of the 6th month of the 10th year of Meiji (30th June, 1877.)

Report of the Director of the Sanitary Bureau to H. E. the Minister of the Home Department, on Choleraic Diseases in Japan during the tenth year of Meiji (1877).

From Simons, M. D., Manning:—

Letter "To the Honorable the Mayor and Aldermen of the City of Charleston, S. C.," relative to the laying of pipes for the water supply of the city.—Simons.

From Snively, M. D., W.:—

Annual Report of the Board of Health of the City of Pittsburgh, 1878.

From Snow, M. D., E. M.:—

Sixth Annual Report of the Births, Marriages, and Deaths in the City of Providence for the year 1860, with a Recapitulation of the Vital Statistics of the city for the last five years, and an Abstract of the Census of Providence in 1860.

Annual Reports of the Births, Marriages, and Deaths in the City of Providence for the years 1861-1865, 1867-1872, 1874, 1876, and 1878.

From Smith, M. D., Wm. Manlius:—

Transactions of the Medical Society of the State of New York for the year 1880.

From Staples, Dr. Franklin:—

Third and Fifth Annual Reports of the State Board of Health of Minnesota, 1875, 1877.

Transactions of the Minnesota State Medical Society for 1875, 1877, and 1879.

From Starkey Henry:—

Annual Reports of the Board of Water Commissioners of the City of Detroit, together with the Reports of the Officers of the Board for the years 1876, 1877, 1878, and 1879.

From State Treasurer of Michigan:—

Annual Report of the State Treasurer of the State of Michigan for the year 1879.

From Stearns, M. D., Henry P.:—

The Fifty-sixth Annual Report of the Officers of the Retreat for the Insane at Hartford, Conn., April, 1880.

From Steiner, A. M., M. D., Lewis H.:—

Annual Address before the American Academy of Medicine, at New York, September 16, 1879.

From Sternberg, M. D., George M.:—

The Microscopical Investigations of the Havana Yellow Fever Commission. Address before the Louisiana Medical Society. Reprinted from the N. O. Medical and Surgical Journal, May, 1880.

From Stevens, M. D., Thad M.:—

Sanitary Survey of Indianapolis. Topography and Surface Geology,—Water-Supply,—Disposal of Excreta, Cellar and Yard Filth, etc. Reprinted from the Transactions of the Indiana State Medical Society, 1880.

From Storer, M. D., Horatio R.:—

Report of the Second Year's Work, 1879-80, of the Sanitary Protection Association of Newport, R. I., and an announcement of prizes to house-owners and tenants.

From Superintendent of Vital Statistics of Michigan:—

Reports to the Legislature of Vermont relating to the Registry and Returns of Births, Marriages, and Deaths for the years 1857, 1859-1868.

From Surgeon General's Office, U. S. Army:—

Index-Catalogue of the Library of the Surgeon General's Office, United States Army. Authors and Subjects. A—Berlinski. Vol. 1.

From Tatham, M. D., John:—

Report on the Health of Salford, England, for the years 1877-78, with statistical abstracts for the decennium, 1869-78.

From Taylor, M. D., J. Stopford:—

Report of the Health of Liverpool during the year 1879.

From Thornton, M. D., G. B.:—

An open letter from G. B. Thornton, M. D., and John Johnston of the Tennessee State Board of Health, to his Excellency the Chief Executive of the State of Louisiana, enclosing an order for the establishment of quarantine against Louisiana.

From Townsend, M. D., E. D :—

The Country Practitioner; or New Jersey Journal of Medical and Surgical Practice. May, 1880.

From Townshend, M. D., Smith:—

Report of the Health Officer of the District of Columbia, for the year ending June 30, 1879.

From Trembley, M. D , J. B.:—

Annual Report and Statistics of the Meteorology and Mortality of the city of Oakland, California, for the year 1879.

From Vandervoort, M. D., John L.:—

The 109th Annual Report of the state of the New York Hospital and Bloomingdale Asylum from the year 1879.

No. V. Supplementary Catalogue of the Books belonging to the Library of the New York Hospital.

From Wadsworth, M. D., J. L. R.:—

Malaria. Annual Address delivered before the Madison County (Ill.) Medical Society, at Edwardsville, April 27, 1880. By J. L. R. Wadsworth, M D.

From Wahl, William H.:—

Report of the Committee appointed by the Board of Public Education to inquire into the Sanitary Condition of the Schools of the First District of Pennsylvania, city of Philadelphia, containing analyses of the air of school rooms, etc.

Reports to the Board of Public Works of Jersey City, on Analyses of the Water of the Passaic River, made by Profs. Henry Wurtz and Albert Leeds, 1873.

A discussion of the Economic Value and Engineering Mismanagement of the Fairmount Waterworks of Philadelphia, by James Haworth. 1878.

The Future Water Supply of Philadelphia. First and Second Papers. By Henry P. M. Brinkenbine. 1878.

Reports of the Board of Health of the City and Port of Philadelphia, for the years 1871, 1873, 1875, and 1876.

Health Officer's Annual Report of Births, Marriages, and Deaths, for the City of Philadelphia, 1878.

Addenda to the Report of the Health Officer of Philadelphia for the year 1877, the subject being House and Street Drainage.

From Weidman, M. D., W. Murray:—

Report of the Board of Health of the City of Reading, 1879.

From Wellings, M. D., J. H.:—

Ordinances relating to the public health. Passed by the Common Council of the City of Lansing, Michigan.

From White, M. D., Robert:—

Contagious Pleuro-Pneumonia, or Lung Plague in Cattle. [Reprinted from the Boston Medical and Surgical Journal, 1879.]

From Wight, M. D., O. W.:—

Second Annual Report of the Health Commissioner of Milwaukee, (Thirteenth Annual Report of the Department), January, 1880.

From Williams, W. B.:—

Seventh Annual Report of the Commissioner of Railroads of the State of Michigan for the year ending Dec. 31, 1878.

From Wolf, Dr. T. R.:—

The Philadelphia Stock-yards and Abattoir; the testimony in favor of their location on the Schuylkill River, above Market Street.

Some Vital Statistics of the City of Wilmington, Delaware. Read before the Delaware State Medical Society, June, 1877, by L. P. Bush, M. D.

American Journal of Microscopy. Vol. 1, 1875.

From Wood, M. D., Thomas F.:—

Sanitary Engineering, by William Cain, C. E. Second Edition. N. C. Board of Health.

From Woolen, M. D., G. V.:—

Transactions of the Indiana State Medical Society, 1879. Twenty-ninth Annual Session.

From Wright, Col. Carroll D.:—

Eleventh Annual Report of the Bureau of Statistics of Labor (Mass.), January, 1880.

From ——— . ———

Eighth Annual Report of the Board of Health of the City of Boston for tho Financial Year 1879-80.

Restriction and Prevention of Diphtheria Document issued by the State Board of Health of Michigan. Reprinted by the Grand Rapids Board of Health.

The Constitution and By-laws of the Ann Arbor Scientific Association, with the Proceedings for the year ending May 1, 1876.

Transactions of the Medical Society of the State of New York, for the year 1879.

Transactions of the Medical Society of the State of Pennsylvania, at its Thirtieth Annual Session, held at Chester, May 1879. Vol. XII. Part II.

Received in Exchange for Publications of this Board the following Periodicals (in some instances incomplete volumes):

Chicago Medical Journal and Examiner.
Buffalo Medical and Surgical Journal.
American Exchange and Review.
Canada Lancet.
Plumber and Sanitary Engineer.
Druggists' Circular and Chemical Gazette.
Metal Worker.
Chicago Medical Gazette.
Good Health.
Herald of Health, New York.
Herald of Health, Bloomington, Ill.
American Oserver.
Medical Brief.
Cincinnati Lancet and Clinic.
Medical Gazette, New York.
Ohio Medical Recorder.
Journal of the Franklin Institute.
Land and Home.
Journal D'Hygiene.
Michigan Medical News.
Physician and Surgeon.
Laws of Life.
North Carolina Medical Journal.
Therapeutic Gazette.
Monthly Weather Review and Weather Maps from the U. S. Signal Service.
New York Medical Eclectic.
Sanitary Journal.
Obstetric Gazette.
Cancer Journal.
Sanitary and Hygienic Journal.
Maryland Medical Journal.
National Board of Health Bulletin.

Weekly or Monthly Mortality Statements have been received during the year past, from Health Officers, Registrars, Officers of Boards of Health, or of Cities in the United States, as follows:

Atwater, M. D., H. H., Health Officer, Burlington, Vt.
Boyd, George, Registrar of Vital Statistics, Patterson, N. J.
Brenner, Chas. E., Secretary Board of Health, Saginaw City, Mich.
Briggs, M. D., Albert H., Health Physician, Buffalo, N. Y.
Buckley, M. D., Chas., Health Officer, Rochester, N. Y.
Cabell, M. D., J. G., President of the Board of Health, Richmond, Va.
Carter, A. R., Secretary Health Department, Baltimore, Md.
Cheatham, M. D., Richard, Health Officer, Nashville, Tenn.
Choppin, M. D., Sam'l, President State Board of Health of Louisiana, New Orleans, La.
Collamore, M. D., G. A., Health Officer, Toledo, Ohio.
Day, M. D., Walter DeForest, Sanitary Sup't and Register, New York City.
DeWolf, M. D., O. C., Commissioner of Health, Chicago, Ills.
Farrand, W. H., Secretary Board of Health, Toledo, Ohio.
Fisher, M. D., A. W., Health Officer, Toledo, Ohio.
Folsom, M. D., C. F., Secretary State Board of Health, Lunacy, and Charity, Boston, Mass.
Furniss, M. D., John P., Registrar Vital Statistics, Selma, Ala.
Galt, M. D., James D., Health Officer, Norfolk, Va.
Gleason, M. D., M. K., Register of Vital Statistics, Chicago, Ill.
Hatch, M. D., F. W., Secretary State Board of Health, Sacramento, Cal.
Herrick, M. D., S. S., Secretary and Treas. State Board of Health of Louisiana, New Orleans, La.
Hunter, W. H., City Sexton, Lansing, Mich.
Johnston, M. D., W. H., Registrar, Selma, Ala.
Jones, M. D., Joseph, President State Board of Health of Louisiana, New Orleans, La.
Knight, M. D., A. W., Health Officer, Jacksonville, Fla.
LaRocque, M. D., A. B., Medical Health Officer, Montreal.
Lebby, M. D., Robert, City Registrar, Charleston, S. C.
Lindsley, M. D., C. A., Health Officer, New Haven, Conn.
Lindsley, M. D., J. Berrien, Health Officer, Nashville, Tenn.
Mackay, M. D., Gustavus E., Health Physician, Buffalo, N. Y.
Mattocks, M. D., Brewer, President Board of Health, St. Paul, Minn.
Meares, M. D., J. L., Health Officer, San Francisco, Cal.
Miles, M. D., Abijah J., Health Officer, Cincinnati, Ohio.
Minor, M. D., Thomas C., Health Officer, Cincinnati, Ohio.
Neal, M. D., Thomas L., Health Officer, Dayton, Ohio.
Park, M. D., J. P., Secretary Board of Health, Knoxville, Tenn.
Pelzer, M. D., George S., City Registrar, Charleston, S. C.
Rezner, M. D., W. B., Health Officer, Cleveland, Ohio.
Robinson, M. D., C. V., President Board of Health, Petersburg, Va.
Scales, M. D., T. S., Medical Health Officer, Mobile, Ala.
Snow, M. D., Edwin M., Supt. of Health and City Registrar, Providence R. I.

Townshend, M. D., Smith, Health Officer and Registrar, District of Columbia, Washington.
Trembley, M. D., J. B., Oakland, Cal.
Walcott, M. D., H. P., Health Officer, State House, Boston, Mass.
Wight, M. D., O. W., Commissioner of Health, Milwaukee, Wis.
Wood, M. D., T. F., Secretary State Board of Health, Wilmington, N. C.
Woolsey, M. D., E. H., Health Officer, Oakland, Cal.
Wyckoff, M. D., R. M., Registrar of Vital Statistics, Brooklyn, L. I.

The following table shows the amount and kind of hard paper there was on hand at last report, the amount purchased during the year, the amount used, and the amount now on hand:

KIND OF PAPER.	On Hand at Last Report.		Purchased Since Last Report.		On Hand Now.		Used During the Year.	
	Reams.	Sheets.	Reams.	Sheets.	Reams.	Sheets.	Reams.	Sheets.
Folio-post	10	414	10	--------	10	413	10	1
Demy	--------	432	1	--------	--------	430	1	2
Blue cover paper	--------	33	1	--------	--------	29	1	4
Green cover paper	--------	224	--------	--------	--------	189	--------	35
Manilla wrapping paper	1	452	1	--------	--------	337	2	115
Blotting paper	--------	24	--------	--------	--------	11	--------	13
Medium	--------	--------	1	--------	--------	347	--------	133
Crown	--------	--------	6	--------	1	113	4	367

The hard paper has been used for making blank books, circulars, printed letters and writing paper. The colored paper has been used for covers to reprints, and record-books for weekly reports of diseases, and wrappers for ozone test-paper.

At the time of making the last report there were about 5,280 sheets of letter, half-letter, and note writing paper; 1 ream and 25 sheets plain letter; 39 sheets legal cap; and 374 sheets of foolscap. Since that time there has been purchased 1 ream of plain letter; 1 ream of foolscap, and 1 ream of legal cap. There is now on hand about 2,146 sheets of whole letter, half-letter, and whole note, 1 ream of foolscap, and 420 sheets of legal cap. There has been 1,043 sheets of letter, half-letter, and note issued to members of the Board. This shows about 2,091 sheets of letter paper to have been used in the office, 1 ream and 25 sheets plain letter, 374 sheets foolscap, and 39 sheets of legal cap.

There were about 53,395 envelopes on hand when the last report was made; 16,000 have been purchased since, making a total of 69,395. There are about 41,637 on hand now, showing that about 28,758 have been used during the year. About 1,100 were issued to members of the Board.

There was on hand at the time of making the last report, postage stamps, unused postal cards, and postage money to the amount of $79.10. Vouchers for postage and box-rent have been allowed during the year to the amount of $581.90, making a total of $661.00. There is now on hand in postage stamps, unused postal cards, and postage money $122.00. This shows that during the year the cost of postage and box-rent has been $539.

Some of the principal items of postage have been as follows:

Sending out the Report of the Board for 1879	$117 89
Sending out Circulars 32, 34, 35, 36, 37, 38, and 39, and document on Restriction and Prevention of Diphtheria	121 73
Sending circulars, printed letters, blanks, meteorological and mortality statements, etc.	65 49
Postal cards printed for report of diseases, receipts to and from this office, etc.	82 55
Sending out Registration Report of Vital Statistics, 1874	6 72
	$394 38

Thus far this report has given exactly, or approximately, the kind and amount of property received, on hand, and disposed of by this office during the fiscal year ending September 30, 1880; but in order to show how much has been expended for all items of property, and for all other expenses during the time specified, the following statement is here presented. It includes vouchers numbers 453 to 535 inclusive.

AMOUNT OF EXPENDITURES BY THE STATE BOARD OF HEALTH, AS PER VOUCHERS NUMBERS 453 TO 535 INCLUSIVE.

Chemical Analysis		
Engraving, Drawing, etc.		
Expenses of Members	Attending Meetings	$205 65
	Other official	--------
Instruments and Books		147 11
Paper, Stationery, etc.		192 51
Postage	Office	581 90
	Members	16 30
Printing and Binding		389 27
Secretary		2,000 00
Special Investigations		--------
Miscellaneous		120 39
Total		$3,653 13

Respectfully submitted,

HENRY B. BAKER,
Secretary.

Having compared the Secretary's annual report of property received, issued, expended, and destroyed during the fiscal year ending September 30, 1880, with the property book and the record of proceedings, and having examined the foregoing account of expenditures, and compared the same with the books in the Auditor General's office, I find the same to be correct.

LE ROY PARKER,
Committee on Finance.

November 30, 1880.

EXPENDITURES BY THE BOARD.

The statement in the foregoing annual report by the Secretary being for the fiscal year ending September 30, in accordance with law and custom, and the appropriations being for the calendar year, a better idea of the uses made of the four thousand dollars for each year appropriated by the legislature for all the expenditures ordered by this Board can be had by means of statements made for the calendar year; accordingly the following tabular statement has been prepared, showing for the six calendar years ending with 1879, the average annual expenditure for each class of items.

In order to show how the latest year differs from the average of the six years 1874–1879, a column is added stating the expenditures for the calendar year 1879.

CLASSIFICATION.		Average Annually for Six Calendar Years Preceding 1880.	Expenditures in Calendar Year 1879.
Chemical Analyses		$ 23 33	$ 10 00
Engraving, Drawing, etc.		114 35	180 00
Expenses of Members	Attending Meetings	133 60	156 15
	Other Official	114 62	152 63
Instruments and Books		269 61	145 76
Paper, Stationery, etc.		214 41	196 19
Postage	Office	433 61	558 36
	Members	12 96	16 18
Printing and Binding		470 34	478 68
Secretary		2,000 00	2,000 00
Special Investigations		42 60	41 40
Miscellaneous		141 54	64 60
Total		$3,970 97	$3,999 95

ABSTRACTS AND BRIEF ACCOUNTS OF THE PROCEEDINGS AT THE MEETINGS OF THE STATE BOARD OF HEALTH DURING THE YEAR ENDING SEPTEMBER 30, 1880.*

REGULAR QUARTERLY MEETING, OCTOBER 14, 1879.

The meeting was called to order in the office of the Board at Lansing, by the President at 9 A. M., the following members being present: R. C. Kedzie, M. D., President; Hon. LeRoy Parker, Rev. D. C. Jacokes, J. H. Kellogg, M. D., and Henry B. Baker, M. D., Secretary. The minutes of the last preceding meeting were read and approved. During the reading of the minutes Dr. Hitchcock came in and took his seat as member of the Board.

Several members made brief announcements of the items of business which they proposed to bring before the Board.

Dr. Kedzie read a paper on the "Waste of Human Life," based principally upon the recent accidents at Adrian and Jackson. He asked that the subject be referred to the committee on legislation, and stated that he thought a law should provide for the examination of architects, of buildings, and of everything appertaining to the subject. Mr. Parker said he thought the present law would hold a man criminally responsible for careless building whereby human life is lost, but possibly more legislation was needed. Dr. Kedzie's paper was accepted with thanks and ordered published in the Annual Report. [See pages 97–102 of the Report for 1879.] The subject of safety of life in public buildings and on lines of travel was referred to the committee on legislation, etc.

Dr. Hitchcock brought up the subject of a proposed addition to a cemetery within the limits of an incorporated village. The members seemed agreed that cemeteries should not be located in villages.

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*Regular meetings occur on the second Tuesday of January, April, July, and October in each year, commencing at nine o'clock A. M.

Mr. Parker reported that he had prepared opinions on several subjects,—one being relative to the duties and compensation of the health officer of Grand Rapids, in which the Attorney General had concurred. [See pages 139–146 of the Report for 1879.] He stated that he was preparing a paper on the general subject of powers and duties of local boards of health, which he could complete in three or four weeks. He was granted time, and asked to complete his paper, and when completed to hand it to the Secretary for publication in the Annual Report. [See pages 289–300 of the Report for 1879.]

Dr. Baker presented a request from the common council of Caro, Tuscola Co., through the village recorder, that the recent outbreak of diphtheria in that village should be investigated. The Secretary was requested to make the investigation, provided the council would pay the expenses.

The Secretary reported the subject of a circular relative to the duties of health officers, and that considerable work had been done in modifying the old circular 28. It was voted that the circular be printed in the Annual Report [See pages 269–278, Report for 1879.] and a number of reprints be made from it, the probable number being about five thousand.

The Secretary presented the subject of a circular relative to notices of diseases dangerous to the public health, by householders and physicians. It was a modification of the old circular No. 25, and embraced one new law and one amended law passed by the legislature at its last session. The Secretary was authorized to print the circular in the Annual Report [See pages 261–268, Report for 1879.] and to cause not to exceed twenty thousand reprints to be made of it.

The Secretary presented a proposed circular on the restriction and prevention of small-pox, and stated that the edition of the former circular was exhausted.

The Secretary presented a proposed printed letter to correspondents relative to weekly reports of diseases. The subject was thorougly discussed, some of the results of the system of collecting weekly reports was shown, and the Secretary was authorized to print the letter.

The Secretary read accounts of acute cases of Glanders in man, by Drs. S. P. Duffield and J. A. Post. He was authorized to incorporate the two communications read, into his paper, [See pages 304–307, Report for 1879].

The Secretary read a report by O. Marshall, M. D., on an outbreak of diphtheria in Clinton county, and it was ordered printed in the Annual Report. [See pages 125–127, Report for 1879.]

The Board adjourned at 12.30 until 2 P. M., at which hour the Board was called to order, the following members being present: R. C. Kedzie, M. D., President; Homer O. Hitchcock, M. D.; Hon. Le Roy Parker; Rev. D. C. Jacokes; and Henry B. Baker, Secretary.

The Secretary presented his annual report of property in accordance with by-laws of the Board, and it was referred to the committee on finances of the Board.

The Secretary read his quarterly report of work in the office, which is on file.

During the reading of the report, Dr. Kellogg came in as a member of the Board.

The Secretary presented a communication from the Secretary of the National Board of Health, with a blank relative to a plan for a national health service.

The Secretary presented the subject of the inspection of steamboats and other vessels on inland lakes, including letters from the Supervising Inspector

General of Steamboats of the United States, a decision of the United States Treasury Department relative to the subject, etc. At his request the papers were referred to Hon. Le Roy Parker, the committee on legislation in the interest of public health, with the request that he should report a bill for the establishment of such inspection in this State.

The Secretary mentioned the receipt of a communication (and a reply made to it) from the Secretary of the National Board of Health, relative to forms for house to house inspection. Correspondence relative to diabetes, including letters from Dr. Lyster and several correspondents, was presented.

The Secretary referred to a lecture on Acute Infectious Diseases, by Prof. J. F. Whittaker, as being very important, and possibly a valuable one to be re-published by the Board. Dr. Hitchcock said a paper on that subject would be presented at the Sanitary Convention in Grand Rapids in February, 1880.

The Secretary presented the New York Tenement House Act and rules of the New York City Board of Health in relation to building-permits, etc. The subject was referred to the committee on legislation in the interest of public health.

The Secretary presented the names of four persons as regular correspondents of the Board; they were approved and the Secretary was directed to ask them to serve.

The Secretary was directed to cancel voucher No. 406, for postage on due letters.

The Secretary was directed to prepare and submit at each October meeting an itemized estimate of the probable expenses of the Board during the succeeding calendar year.

Hon. LeRoy Parker was requested to edit and prepare for publication the correspondence, opinions, etc., relative to the duties of the health officer at Grand Rapids, and when completed it was voted to publish it in the Annual Report. [See pages 139–146, Report for 1879.]

Bills were audited—vouchers 453–467, amounting to $653.32.

During the auditing of bills Dr. Lyster came in and took his seat as a member of the Board.

Dr. Hitchcock presented a report, as committee on epidemic, endemic, and contagious diseases. The report related principally to diphtheria, and embodied many communications referred to that committee. The report was accepted with thanks and ordered published in the Annual Report. [See pages 103–137, Report for 1879.] Dr. Hitchcock returned several communications, some of which, at his request, were referred to other committees, and the others placed on file.

Dr. Lyster presented a report on Drowned Lands, being a continuation of a paper heretofore presented. It was ordered published in the Annual Report. [See pages 233–260, Report for 1879.]

Dr. Kedzie, committee on food, drinks, and water-supply, reported an analysis of water from a well in Lansing, supposed to have caused typhoid fever. The statement of the analysis showed the water to be contaminated by decomposing organic matter.

Dr. Hitchcock, former committee on the disposal of excreta and decomposing organic matter, presented a report on slaughter-houses and the business of slaughtering. The report was accepted and ordered published in the Annual Report. [See pages 63-80, Report for 1879.]

Dr. Kellogg, committee on the removal of excreta and decomposing organic matter, read a paper on Sanitary Associations, which contained illustrative descriptions of modes of disposal of excreta applicable where such associations might exist. The paper was accepted with thanks and ordered printed in the Annual Report. [See pages 81–95, Report for 1879.]

Hon. Le Roy Parker was requested to prepare a report on the authority of local boards of health to kill horses affected with glanders, such report to be published in the Annual Report in connection with Dr. Baker's report on that subject, or separately as it may be determined. [See pages 300 and 330–1 of the Report for 1879.]

Hon. Le Roy Parker, committee on finances of the Board, reported having compared the Secretary's "annual report of property received, issued, expended and destroyed during the fiscal year ending Sept. 30, 1879, with the property book and the record of proceedings," and having examined the account of expenditures and compared the same with the vouchers in the Auditor General's office, had found the same to be correct.

The report was accepted and adopted.

Dr. Baker, committee on Diseases of Animals, reported that the Governor would appoint a commission of three members, under the act of 1869, requiring a commission for the prevention of the introduction of contagious diseases among animals in this State. Dr. Lyster said the subject of Texas cattle disease was an important one as numbers of cases occurred in Detroit each year, and some of them were undoubtedly killed for food. Dr. Kedzie mentioned a case where 290 persons were made ill by eating diseased beef, and Dr. Baker mentioned an outbreak of typhoid fever in Germany, where over 200 cases of sickness were traced to the eating of a calf sick before being killed for food.

Dr. Baker reported a paper on "Glanders" and he was requested to complete the paper and publish it in the Annual Report for 1879. [See pages 301–334.]

Dr. Hitchcock, as special committee, reported a plan for a National Health Service, which was adopted by the Board, and the Secretary was directed to transmit a copy of the plan to the National Board of Health, as the recommendation of this Board in response to a request from the National Board.

Drs. Hitchcock and Lyster, committee on Sanitary Convention, presented a report, recommending the first one to be held at Detroit and the second one at Grand Rapids, and giving details of the first one. The report was adopted. [See pages 1–183 of this Report.]

Dr. Baker presented the subject of the common use of the term "night-soil," as applied to excreta, and stated that it was a misnomer; that there were two factors in the removal of foul gases, which were both more active in day than in night. He referred to the wind, which "goes down with the sun," and ozone, which was present in less quantity in night than in day, and referred to diagrams which showed these facts. For these reasons he objected to the removal of excreta in the night. The subject was referred to committee No. 6.

The Board voted that the law of 1879, relating to illuminating oils, be printed as an appendix to the paper of Dr. Kedzie on the Historical Review of Legislation relating to the Inspection of Illuminating Oils in Michigan. [See pages 14a–14d, Report for 1879.]

The Secretary presented an ordinance of the city of West Bay City relative to vaccination, which was refered to the committee on Legislation.

Dr. Lyster, committee on Examinations in Sanitary Science, reported the plan for such examinations read at the meeting of the Board in July. Dr. Baker presented a modification of the plan prepared in accordance with a resolution passed at the July meeting. After modification of the second plan it was accepted by Dr. Lyster and adopted by the Board. [See pp. 509–512, Report for 1879.]

On motion, the Board adjourned.

SPECIAL MEETING AT DETROIT, JANUARY 7, 1880.

In pursuance of the following call by the President, the Board met at the residence of Dr. Lyster, in the city of Detroit:

LANSING, DECEMBER 31, 1879.

Member of the State Board of Health:

SIR:—A special meeting of the State Board of Health is hereby called at Detroit on Wednesday and Thursday, January 7 and 8, 1880, to transact business connected with the Sanitary Convention at that time and place, and such other business as may come before the Board, including the auditing of accounts.

[Signed,] R. C. KEDZIE, *President.*

The Board was called to order at 5:15 P. M., by the President, the following members being present: R. C. Kedzie, M. D., President, Hon. LeRoy Parker, Rev. D. C. Jacokes, and Henry B. Baker, Secretary.

The reading of the minutes of the preceding meeting was dispensed with, the regular order of business suspended, and the auditing of accounts taken up. Bills were audited—vouchers 468–488—to the amount of $930.54.

The Secretary presented a proposed circular to clerks of local boards of health, and a blank form for their report, which were approved by the Board and ordered printed.

The rule requiring unanimous consent of members to print circulars, etc., in the intervals of meetings was reäffirmed.

The Board voted that the Plan for Examinations in Sanitary Science should be printed in the Annual Report for 1879. [See pp. 509–512.]

The Board approved the names of three persons as correspondents.

Rev. Mr. Jacokes reported that Mr. Wells, who had been invited to prepare a paper on the sanitary construction and management of the asylum at Pontiac, was unable to prepare such a report on account of his illness.

The Secretary was authorized to purchase one barometer, two psychrometers, and four rain gauges for the use of the meteorological observers of the Board.

Mr. Parker requested that a copy of the estimated classified expenditures of the Board for 1880 be sent to each member.

On motion, the Board adjourned.

SPECIAL MEETING AT GRAND RAPIDS, FEBRUARY 18, 1880.

Pursuant to a call of the President the Board met at Sweet's Hotel in Grand Rapids, February 18. The Board was called to order at 9:15 A. M., the following members being present: R. C. Kedzie, M. D., President; Hon. LeRoy Parker; Rev. D. C. Jacokes, and Henry B. Baker, Secretary.

The reading of the minutes of the preceding meeting was dispensed with and the regular order of business suspended, and the auditing of accounts taken up.

Bills were audited—vouchers 489–507—to the amount of $581.95.

It was voted that in the intervals of meetings of the Board the President and Secretary shall monthly certify the amount due the Secretary as salary.

Eleven persons were approved as regular correspondents of the Board.

As some inquiry came from those who participated in the Sanitary Convention at Detroit relative to the printing of the proceedings, the Secretary was directed to reply to them that if they would pay for the electrotyping of the printed matter and for what reprints they wanted personally the Board would print immediately. He was also directed to make the same offer to those taking part in the Grand Rapids convention.

The Secretary presented a report by J. H. Kellogg, M. D., Committee No. 6, on "Sawdust in Streams, etc." [This report was afterwards completed and is printed on pages 213–220 of this Report.]

On motion, the Board adjourned subject to the call of the President.

REGULAR MEETING, APRIL 13, 1880.

The Board came to order at 9 A. M., in the office of the Board, at Lansing, and in the absence of the President, H. O. Hitchcock was chosen president *pro tem.* The following members were present: H. O. Hitchcock, M. D.; Rev. D. C. Jacokes; J. H. Kellogg, M. D.; Henry B. Baker, Secretary.

The Secretary read the minutes of the regular meeting October, 1879.

During the reading of the minutes, Hon. LeRoy Parker came in and took his seat as a member of the Board.

After some discussion the minutes were approved as read.

The minutes of the special meetings at Detroit Jan. 7, and Grand Rapids Feb. 18, were read and approved.

Mr. Parker was excused, expecting to return at noon.

The next order of business being the President's Annual Address, the Secretary presented a letter from the President, saying he had had neither time nor strength to prepare an address, and suggesting that the rule requiring an annual address from the President be so changed as to make it optional with the President whether he prepare one or not.

In accordance with the suggestion, Section 4 of Article II. of the By-laws of the Board were amended to read as follows:

SEC. 4. At the annual meeting of the Board, in April in each year, the President, if he shall desire to do so, shall present an address.

Several items of business were announced by the members, to be taken up in the proper order.

After reading a letter from the President, stating his inability to attend the meeting on account of the serious illness of his son, Dr. Baker offered the following, which was adopted:

WHEREAS, By the severe illness of his son, Prof. W. K. Kedzie, Dr. Kedzie, President of this Board, is unable to be present at this meeting, therefore,

Resolved, That the sincere sympathy of the members of this Board is extended to Dr. Kedzie and his family, in this, their time of great anxiety.

The Secretary read reports of work in the office during the quarters ending Jan. 7, 1880, and April 13, 1880.

The Secretary presented a few illustrations of work done by local boards of health, as follows:

(1.) Card for posting in privies, urging perfect cleanliness and the adoption of the dry-earth system, and

(2.) Circular relative to cleanliness of premises, both issued by the board of health of the village of Tecumseh.

(3.) Statement that a series of sanitary articles were to be printed in the Tecumseh newspaper, the first article to be furnished by the President of this State Board of Health.

(4.) A new ordinance of the city of Lansing requiring burial-permits. This being the first city in the State to adopt this plan.

(5.) Statement relative to the documents issued by Mayor H. H. Holt, of Muskegon, regarding the restriction and prevention of diphtheria.

A communication was read from C. H. Voute stating his willingness to form a circuit of cities and villages in the State and work in them with the "odorless excavating apparatus." It was voted that local boards of health are recommended to secure the cleaning of vaults by means of the odorless excavating apparatus.

It was voted that letters, papers, etc., referred to the committees of the Board should be returned in their original condition, unmutilated and legible, the writing not desirable to be printed being crossed with a lead pencil.

It was voted that the document on the restriction and prevention of scarlet fever be revised, republished, and electrotype plates secured of the same. It was also voted that when revised the document be referred to Dr. Hitchcock, committee No. 1, and when approved by him it be printed.

Two persons were nominated and approved as regular correspondents of the Board.

A communication from Dr. Billings, Vice President of the National Board of Health, relative to the convention of Registrars of Vital Statistics and others at Washington, was discussed, but no formal action taken.

At 11:15 A. M., Hon. LeRoy Parker came in and took his seat as member of the Board.

The Secretary stated that he had had correspondence with Dr. Billings of the National Board of Health, relative to undertaking a study of the causative relation between filth and diphtheria. He had felt compelled to decline the work on account of excess of work as Secretary, but that his expectation was that no causative relation could be found. He thought it important to know the facts as to the contagiousness of the disease, the means by which it is spread, and the best means for its restriction and prevention. The subject was thoroughly discussed and the desirability of such an investigation fully appreciated.

The Board adjourned until 2 P. M. of the same day.

Afternoon Session, April 13, 1880.

The following members responded to the roll-call at 2:40 P. M.: H. O. Hitchcock, M. D., Rev. D. C. Jacokes, J. H. Kellogg, M. D., Henry B. Baker, M. D.

After considerable discussion it was voted that the transactions, and all papers read at the Sanitary Conventions at Detroit and Grand Rapids be printed in the Annual Report for 1880, and all papers sent in to be read but not read be referred to the Secretary, with instructions to print such as in his discretion were valuable for that purpose.

The Secretary was directed to begin printing the Report for 1880 as soon as practicable, without interfering with the work already in hand.

It was voted that the report of the Committee on Sanitary Conventions be printed as introductory to the subject, and that the Secretary also refer to the past annual addresses of the President of the Board.

It was voted to have not to exceed 200 reprints of the proceedings of the convention as a whole, and not to exceed 200 reprints of any separate paper, at the discretion of the Secretary. Authors of papers were granted permission to have as many reprints as they wished at their own expense.*

Dr. Hitchcock was requested to attend for this Board the meeting of the State Medical Society at Grand Rapids.

The subject of sending a delegate to the meeting of the Sanitary Council of the Mississippi Valley, at St. Louis, Mo., was discussed, but owing to a lack of funds no delegate was sent.

At 3:44 P. M., Hon. LeRoy Parker came in and took his seat as a member of the Board.

A letter from Lee S. Cobb of Nirvana, meteorological observer for this Board, stated that he was about to remove to Onondaga. It was voted that E. S. Richardson, M. D., of Reed City be invited to make observations in Mr. Cobb's place, and if Mr. Cobb was to remain permanently at Onondaga that he be requested to continue his observations at that point.

The Secretary was directed to procure two thermometer-bulbs for the psychrometer at Three Rivers.

Dr. Kellogg thought this was a favorable time for an investigation into the causation of diphtheria, and that if the National Board of Health would bear most of the expense, it might be desirable for this Board to undertake the investigation. The Secretary was directed to correspond with the National Board and see what arrangements could be made, and was given power to act at his discretion upon propositions made by the National Board of Health.

The Board audited bills—vouchers numbered 508–520 inclusive—amounting to $733.45.

Dr. Hitchcock returned papers and documents referred to him as Committee No. 1, and tendered his resignation as Committees Nos. 1 and 14, announcing his intention of presenting his resignation as a member of the Board, stating that he no longer wished to sacrifice his pecuniary interests, as he had to do each time he attended a meeting of the Board.

Dr. Kellogg reported upon several papers which had been referred to him on the subject of saw-dust in streams. He read a paper on the subject, and stated that he wished to add to it hereafter. It was voted that he be requested to complete the paper, and when completed that it be published in the Annual Report. [See pp. 213–220 of this Report.]

It was also voted that when the paper should be completed it be referred to Hon. LeRoy Parker, committee on legislation, with a request to ascertain what legislation, if any, is needed to abate the evil, and if necessary to prepare a bill embodying the needed provisions.

Rev. Dr. Jacokes, chairman of the committee on sanitary survey, made an informal report, and expected to submit a formal report in October.

In reply to a question, the Secretary said that the Governor had not yet appointed the cattle commission which he was authorized to appoint.

Dr. Baker, committee on diseases of animals, etc., reported that he had completed his paper on Glanders, and that it was printed in the Annual Report. He also spoke of the struggles of the New Jersey State Board of Health with pleuro-pneumonia of cattle. Also, that he had been invited to attend a convention in New Jersey on the subject of pleuro-pneumonia in animals.

Dr. Baker, special committee to visit Caro, Tuscola county, to make an investigation into the epidemic of diphtheria at that place, reported that because of sickness in his own family he had beeen unable to go at the desirable time.

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* The papers being in type for the Annual Report of the State Board of Health, the expense to the authors for reprints would be simply that for making over the form, press-work, and paper.

Dr. Baker read a report as member of special committee to confer with the Board of State Auditors relative to illustrations for the Annual Report.

The Secretary was authorized to have printed not to exceed twenty thousand copies of each of the documents on the restriction and prevention of scarlet fever and of diphtheria.

It was voted that the qualifications of candidates in Sanitary Science Examinations should be decided by a majority vote of members of the Board; and Sec. 8 of the Regulations was so worded as to conform to that plan. [See p. 269.]

The Board adjourned at 6:55 P. M.

REGULAR QUARTERLY MEETING, JULY 13, 1880.

The Board was called to order at 9:00 A. M. by the President, and the following members responded to their names at roll-call: Prof. R. C. Kedzie, President, Rev. D. C. Jacokes, Dr. Henry F. Lyster, Dr. John H. Kellogg, Dr. Henry B. Baker.

The minutes of the regular meeting held April 13 were read and approved.

Under the order of announcement of business to be brought before the Board, Dr. Lyster announced that if desired he would prepare for the October meeting a paper on Syphilis. He was requested by vote to prepare such a paper.

The Secretary read a list of nineteen items of business which he wished to bring before the meeting.

The Secretary read his quarterly report of work in the office. It was accepted and placed on file.

The Secretary announced the resignation of Dr. Hitchcock as a member of this Board; also the appointment, by the Governor, of Prof. Edwin A. Strong, of Grand Rapids, as Dr. Hitchcock's successor. The Secretary read Dr. Hitchcock's letter of resignation, also a copy of the letter of the Governor accepting the same.

Drs. Lyster, Kellogg, and Baker were appointed a committee to prepare resolutions relative to the resignation of Dr. Hitchcock.

A letter from F. G. Russell, City Attorney of Detroit, was read, relative to the lack of a health officer or a board of health in that city and suggesting action by this Board looking to the performance of duty by officers of that city.

Dr. Lyster spoke of the lack of accurate statistics of deaths, etc.. in Detroit.

Dr. Lyster was appointed a committee to perfect a plan for an efficient board of health for Detroit, and to urge upon the city authorities the duty of adopting such a plan. On motion Dr. Baker was added to the committee.

A letter from Prof. Albert R. Leeds, of the Stevens Institute of Technology, relative to standardizing the ozone test-paper used by this Board, stated that the work could be done for fifty dollars. The Secretary was directed to correspond further with him on the subject.

The Secretary read a letter from Hon. Henry W. Lord, which contained some statistics relative to pauperism caused by sickness in the State of New York. Dr. Lyster stated that he thought one-third of those who apply to the authorities for relief gave sickness as a cause for their needs. It was suggested and voted that there be a standing committee, No. 16, entitled "The Relations of Preventable Sickness to Taxation." Dr. Kellogg was appointed as the committee, and the correspondence already in hand relating to the subject was referred to him.

The title of committee No. 9 was changed so as to read, "No. 9. The Relations of Schools to Health."

The question of discontinuing the committee No. 14, and the recasting of the other committees was deferred until the October meeting.

A card was read from Hon. LeRoy Parker announcing his inability to be present at this meeting.

The Secretary was authorized to attach to the Regulations for examinations in Sanitary Science a list of books which would be found valuable for candidates to read. It was voted that each member of the Board prepare a list of ten topics to be asked the candidates, and the manner of marking the candidates was voted to be as follows: The replies on each set of topics shall be marked on a scale of ten; and an average standing of seventy per cent on all the topics shall be necessary in order to pass the applicant.

The Board adjourned until two o'clock P. M. of same day.

Afternoon Session.

Upon the meeting being called to order by the President, the following members were found to be present: Prof. R. C. Kedzie, Rev. D. C. Jacokes, Drs. Lyster, Kellogg, and Baker.

It was voted that the examinations in Sanitary Science shall be in writing, and that after this examination they shall occur on the same day as the meeting of the Board.

The Secretary was then directed to conduct the examination on the following day, namely, July 14, 1880.

Under the head of introduction of new business, the Secretary read a paper on Unsanitary Conditions in our Public Schools, by Dr. G. E. Corbin, of St. Johns, being part of his replies to Circular 38. The paper was accepted with thanks and ordered printed in the Annual Report. [See pages 185–190 of this Report.]

A paper on Methods of Observing Ozone, and one on Periodic Fevers, including a record of 118 cases, both papers being by A. W. Nicholson, M. D., Otisville, Michigan, were accepted with thanks and ordered published in the Report. [See pages 285–302 and 191–212 of this Report.]

The Secretary was directed to prepare and present at the next meeting of the Board a suitable design for a certificate to be given to those who pass the examination of the Board in Sanitary Science.

Three persons were proposed and approved as regular correspondents of the Board.

A communication was read from H. F. Sigler, M. D., relative to diphtheria near Pinckney. As there was now no committee to refer such communications to, the Secretary was authorized to make such use of this and similar communications as would most advance the interests of public health. [See following pages in the first part of this volume.]

The Secretary was authorized to reprint the circular to health officers of cities, demanding weekly reports of diseases.

The Secretary presented papers on diabetes, and was instructed to use them in the Annual Report if found available, or otherwise at his discretion.

The special committee appointed at this meeting to prepare resolutions relative to the withdrawal of Dr. Hitchcock, reported the following resolutions which were adopted:

Resolved, That in the retirement of Dr. Hitchcock from membership in this Board, the Board loses one of its most efficient and distinguished members;

Resolved, That the individual members of the Board regret the personal separation thereby entailed, and extend to the retiring member their best wishes for his continued prosperity.

The Secretary was directed to transmit a copy of the resolutions to Dr. Hitchcock.

Dr. Kedzie in stating that he had been requested by a gentleman from Chicago to make some investigations into the adulteration of food said the adulteration of sugar was increasing and was more skillfully done than formerly. He had found glucose in granulated sugar. Pure glucose was not necessarily injurious but simply a fraud, but glucose was not usually pure. He had replied to the gentleman that this Board had not the means to conduct such investigations.

Bills and accounts were audited—vouchers numbered 521 to 535 inclusive—to the amount of $753.87.

The Secretary stated that the Governor had appointed the members of the State Cattle Commission, under Act No. 163, Laws of 1869, as follows: Hon. S. B. Mann, of Adrian, A. J. Murray, V. S., Detroit, and J. B. Griswold, M. D., Grand Rapids.

An ordinance to prevent contagious diseases, passed by the council of East Saginaw, was presented, commented on, and referred to Hon. LeRoy Parker, committee on public health legislation.

The Secretary was directed to prepare a design for an official seal for the Board and present it at the next meeting.

The Board adjourned at five o'clock P. M.

SANITARY SCIENCE EXAMINATIONS, JULY 14, 1880.

In the examinations in sanitary science conducted by this Board July 14, 1880, two candidates passed the examination by the Board satisfactorily, and received the certificate of the Board which reads as follows:—

STATE BOARD OF HEALTH, OF MICHIGAN.

THIS IS TO CERTIFY THAT.......................has been examined in the several departments of SANITARY SCIENCE, by the members of the Michigan State Board of Health, and has been declared properly qualified in sanitary science to act as HEALTH OFFICER of any township, city, or village in Michigan.

In witness whereof, The members of the Board have hereunto affixed their names and the official seal of the Board.

Done at Lansing, Michigan, this.... ....day of.............., 18.....

........................President. ....

[SEAL.] ....

....

....Secretary.

The regulations governing the examinations,* lists of questions asked the candidates at the examination in July, 1880, and a list of books desirable for candidates to consult, are given on pages 267–276 of this Report.

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* The unexpected delay in the printing of this part of this Report makes it possible to state here that paragraphs 4 and 5, in the regulations printed on page 269, have since been amended to read as follows:—

4. Each and every candidate for examination shall, before appearing at the examination, pay to the Secretary of the Board an examination fee of one dollar.

5. The examination fee of those applicants who do not receive the certificate of the Board will be returned to them. H. B. B., Sec. S. B. of H.

The successful candidates in July, 1880, were Henry B. Baker, M. D., of Lansing, and Melle Veenboer, M. D., of Grand Rapids.

SPECIAL REPORTS, COMMUNICATIONS, ETC.

A resolution adopted by the State Board of Health, Jan. 14, 1879, is as follows:

> *Resolved*, That the Secretary be requested immediately to forward to the appropriate committee all communications addressed to the Board, which relate to the work of the regular committees, to be considered and reported upon by such committee at the next meeting of the Board.

During the latter part of the fiscal year 1880 the reference of communications under this resolution was somewhat interrupted by a vacancy in the Board and in some of the committees of the Board. A list of communications referred with the names of the members of the Board to whom they were referred is printed near the end of this first part of the Report, the part paged in Roman numerals. A list of the standing committees of the Board is printed on pages vii–viii. Another resolution authorizes the Secretary at his discretion to use in this first part of the Report communications returned by committees or not wanted for use by them. Those selected for use by the Secretary follow herewith.

DIPHTHERIA.

Concerning the prevalence of diphtheria in Michigan, the ways in which it is communicated from person to person, and the means for its prevention, much has already been published in the Annual Reports of the State Board of Health. Reference may be made to pages 351–390 of the Report of 1877, to pages 77–89 of the Report for 1878, to pages lvii–lviii, 105–131, 164–7, and 486–91 of the Report for 1879, and to pages 452–3 of this volume; also to other pages in each of these Reports, of articles on the Diseases in Michigan, and on Weekly Reports of Diseases in Michigan in the years 1876–7–8. Of the document on the Restriction and Prevention of Diphtheria, on pages 86–9 of the Report of 1878, over 20,000 copies have been distributed in the State by the State Board of Health, and a large number by local boards of health. It is believed that much sickness has been prevented and many lives saved by this means. Yet from want of a general movement for its suppression, the disease continues in the State. It may help to arouse people from their indifference to the ravages of diphtheria to present, along with facts and figures relating to the prevalence of the disease, still further words from those who have cared for the sick, sought to guard the well, or mourned for the dead.

Some of these communications give prominence to unsanitary conditions of air, water, or house, found with the disease. Others give greater prominence to means by which the disease may have been communicated from one person to another. In their search for a cause of an outbreak of diphtheria people sometimes overlook obvious means by which it may have been derived from a previous case. A valid conclusion from all the evidence presented would seem to be that no amount of cleansing of premises and wells can do away with the necessity for constant care to avoid exposure to the disease.

OUTBREAK OF DIPHTHERIA AT CARO, MICH.—REPORTED BY C. P. BLACK.

Early in the spring we had a few cases of diphtheria, and about half of the cases died. I then endeavored to impress upon the authorities that something should be done to check the spread of the disease. There was a lull in it for a while and nothing much was done. It has again broken out and the fatal cases are increasing daily. I have contended with the citizens generally that the malady is propagated either by infection or contagion, and I have evidence that satisfies me beyond question that such is the case. Still public funerals are held over those dying with this pestilence, and the people wonder what spreads the disease. Now I would like your opinion upon the question of its being contagious or infectious, and any other opinion or advice you may deem pertinent in the interest of public health. I do feel that the dictates of humanity ought to lead people to do what they can to stay this "slaughter of the innocents."

An early reply is awaited. Yours truly,

Caro, Tuscola Co. Mich., Sept. 22, 1879. C. P. BLACK.

DIPHTHERIA AND SCARLET FEVER AT HOWELL, MICH., REPORTED BY HEALTH OFFICER.

We are having a few cases of scarlet fever at the present, but they are getting better. Have had some 15 cases of diphtheria; all recovered. Every precaution has been taken to prevent its spread both by the village board and co-operation of the school board.

Yours respectfully,

Howell, Livingston Co., Mich., Nov. 3, 1879. HORACE R. HITCHCOCK, M. D.,
Health Officer for the Township and Village of Howell, Mich.

DIPHTHERIA AND SCARLET FEVER IN ASSYRIA, MICH., REPORTED BY TOWNSHIP CLERK.

I have had reported to me, as clerk, one case of scarlet fever and one case of diphtheria, which the township board of health have taken under their care. No deaths yet reported.

Yours, etc.,

Assyria, Barry Co., Mich., Jan. 22, 1879. B. T. KENT, *Town Clerk.*

SEVEN CASES OF DIPHTHERIA IN VERMONTVILLE, MICH., REPORTED BY TOWNSHIP CLERK.

There have been reported to the board of health of this township up to this date 7 cases of diphtheria in this township, one fatal. Respectfully yours,

Vermontville, Eaton Co., Mich., January 23, 1879. MART F. BARBER,
Township Clerk.

DIPHTHERIA IN NEWBURG, CASS CO., MICH., REPORTED BY HEALTH OFFICER.

I would call your attention to an endemic of malignant form of diphtheria occurring in my practice. Having located here the last of April, of this year, 1879, and hearing of so many cases of so-called diphtheria in this locality and but one or two deaths therefrom, I paid particular attention to all cases of sore throat falling under my care, of which I had quite a number during the summer, but none of which presented, in my opinion, any appearance whatever of diphtheria, all taking on the ulcerated form.

The first case falling under my observation, that presented the characteristic symptoms and form of diphtheria, occurred in this place. On Aug. 21, 1879, the only daughter, age 6, of Mr. Joel Swift, was taken with a light chill, followed by intense fever and sore throat. At my first visit I found both tonsils covered with a whitish membrane, and also a thin film on fauces. In the evening the membrane had taken on that peculiar ashy, gangrenous appearance, with fœtid breath, and accompanied with excessive fever and physical prostration. The following day there seemed to be no change, but by close attention and careful treatment, by the following day the fever began to abate and constitutional symptoms improve, and the throat having cleared up, and general symptoms being good, I discharged her on the 28th. By keeping this case isolated, no other case has occurred in town since. I omitted to say that how she contracted the disease I was unable to learn, as she had not been from home previously.

The first case of the malignant type came under my care on the eve of September 5, there having been no other case since the one in the Swift family, when I was called to see Charlotte Dalson, age 3 years, about 4 miles from this place, in the country. She was represented to me as being in a very critical condition from a severe cold contracted several days previously. I found the little patient with burning fever, excessive sanguineous discharge from the nose, neck slightly swollen, and a hoarse, croupy cough. The nervous and bodily prostration was extensive, blood poisoning excessive, and a speedy fatal issue evident. Although she had not complained once of her throat, I found the throat, soft palate and all, extending far down, completely covered with a thick tough membrane, also covering the membrane of the nostrils. Death took place early the following morning.

On the following day I was called to a neighbor's house, about one-half mile distant from Mr. Dalson's. Found a boy age 6, son of Wm. Masser, presenting all the symptoms of the above case, with the exception that it had run only about two days, and hence the disease was not so thoroughly seated. This case ended in recovery. On the 7th Alice Dalson, age 11, was taken with a severe chill followed by excessive fever and vomiting. By the way, chill followed by intense fever and vomiting for from 12 to 24 hours were the first symptoms of all, or nearly all, of those coming under my observation. Although she did not complain of her throat being sore, on my first visit I found the throat almost a solid mass of gangrenous membrane, so much so that it was impossible to discover the uvula. Severe nervous and physical prostration followed, as in all the cases, and although we looked for death hourly, she recovered, and I discharged her on the 22d. I would say that the bloody discharge from both nose and mouth was profuse. After recovery liquids regurgitated through the nostrils, and speech was indistinct and is so still. Her recovery was surprising. None of the other children, of whom there were three more, were taken till October 16, when Emma, age 5, was taken similar to the others. This ended in recovery, and the other two have escaped thus far.

On the 9th, Frank and Edward Masser, ages 4 and 9, came down. Both recovered. On the 6th the remaining boy, Chas. Masser, was taken, age about 3. Death followed on the 17th. On the 4th Laura Masser, age 11, was taken and died on the 16th. On the 6th Lula Masser was taken, and was doing well when scarlet fever set in, and she died on the 5th of October. The fatality of this family was caused by exposure and neglect. The family had only moved into a new house about one week previously to the first child's attack. The house was merely boarded up and down and not battened and without partitions, being a ground floor and chamber above. The weather was cold and rainy. They had no nursing except what the worn-out parents could give, as all were afraid to enter the house.

On Sunday, the 7th, at about 2 A. M., I was called to see two boys, ages about five and six, H. and C. Cox, neighbors of Mr. Masser's, about three-fourths mile distant. C. complained the previous Wednesday, H. on Saturday. Mother was using remedies for bad cold, as there was no complaints of the throat. I was urged to make haste as C. was probably dying. I found him croupy and presenting the disease in an exceeding severe form. H.'s was of a milder form, but also very severe. C. died on Monday morning. H. recovered. Three more of the family were taken, but recovered. One escaped. Albert's sickness, aged 14, was of the severest type, but, as I said, he recovered, beyond expectation.

In all of the above cases I could not trace the origin of the disease, as no one of them had been exposed to anything of the kind. All the way I could account for it was that the lake (Corey's) was near,—in fact the house where the first case occurred was on its bank; the Cox house, about three-fourth mile south. Just before the breaking out of the disease we had a long dry spell and the lake became quite low and emited an unpleasant odor; also that the Dalson and Masser houses were located on newly cleared ground. The drouth followed by nearly two days' rain, as the case was, caused the decaying roots and vegetable growth of both lake and clearing to liberate its malaria poison. But the family of John Masser, living about half way between Wm. Masser's and Dalson's, with the exception of a slight inflammation of the throats of their two children, enjoyed perfect health at the time; but on October 16, the same day that the last one of the Dalsons' was taken, Olive, age 5, daughter of John Masser was taken, but made a good recovery and was discharged on Nov. 1. I considered this as quite a critical case. John Masser's boy, the other child, has not had it yet.

On the same day, Oct. 16, Maud Harwood, age 6, came under my care, living about one mile north of the same lake, but about 2½ miles distant from the nearest of these families. A sister, age about 4, had been taken with the disease the Sunday previous and was buried on the following Saturday, (Oct. 15). She was attended by one Dr. H. of this place, who also lost one at Corey's, distant about two miles east of this place.

Oct. 31, Ella Youngs, age 14, came under my care, but made a speedy recovery. On Nov. 8, Maud Youngs, age 15 mos., sister, also was taken, but this case, owing to difficult treatment on account of age terminated fatally on the 14th.

I had many other cases, in all about 35, some of quite a severe type, but others of a milder nature. These all ended in recovery.

In my treatment of these cases I have noticed one feature: that taking it outside of the locality of Dalson, Masser, and Cox families—at the lake and clearing—as a general thing the disease yielded quite readily to treatment.

Again almost all, with but about three exceptions, were children. In fact none of the adults presented those characteristics of the disease. Why should this be when all were under the same influence?

Respectfully,

Newburg, Cass Co., Mich., Nov. 26, 1879. REUBEN SCHURTZ, M. D.,
Health Officer of Township of Newburg, Cass Co.

The following reply to this communication was sent Nov. 28. It is here inserted as suggesting means and way of conveyance of the disease from one child to another, that might at first be overlooked in communities where the disease had not long prevailed. Intelligent people must learn how this disease is communicated, that they may be on guard. At the same time proper isolation of infected persons does not require that any one be left to suffer for want of care. All children should be kept away from those sick with diphtheria, but adults with proper care in their association with others, especially with children, should attend to all wants of the sick.

OFFICE OF THE SECRETARY OF THE STATE BOARD OF HEALTH,
LANSING, MICH., November 28, 1879.

Reuben Schurtz, M. D., Health Officer of Newburg Township, Newburg, Cass Co., Mich.:

DOCTOR—Your communication of November 26, relative to an outbreak of disease—diphtheria—in your vicinity is received. Please accept very hearty thanks. That you are unable to trace the spread of the disease seems very surprising to me. The fact that the families lived so closely and were probably on visiting terms seems to indicate that the disease might have been carried from the first case. Will you have the kindness to answer the following questions, and study the outbreak in accordance with the suggestions you may gather from them:

In the first case, Joel Swift's daughter, could there have been any possible connection between it and the next case, Charlotte Dalson?

Was there a public funeral over the corpse of Charlotte Dalson? And, if so, did any of Wm. Masser's family assist in preparations for the funeral, or attend the funeral? If not, did any person, yourself included, visit successively Mr. Dalson's child and then Mr. Masser's?

You are probably aware that the contagion may be carried from a person sick with diphtheria to another person, who may have it, while the person carrying it may not have it.

It seems impossible that there was not more or less communication between these families, being so near together, and help and assistance being needed during the sickness.

Will you be so kind as to trace, if possible, the intermingling of the families, as it would bear upon this outbreak? If possible, please send a little plat or map of the vicinity, showing location of each house, order of each case, roads, etc.

What means were taken to restrict the disease?

By mail to-day I send you a blank record on which to record all your cases, in your own practice or reported to you as health officer. Please make a special report on this subject, and make the report as complete as possible, using blanks sent you by this mail. * * * *

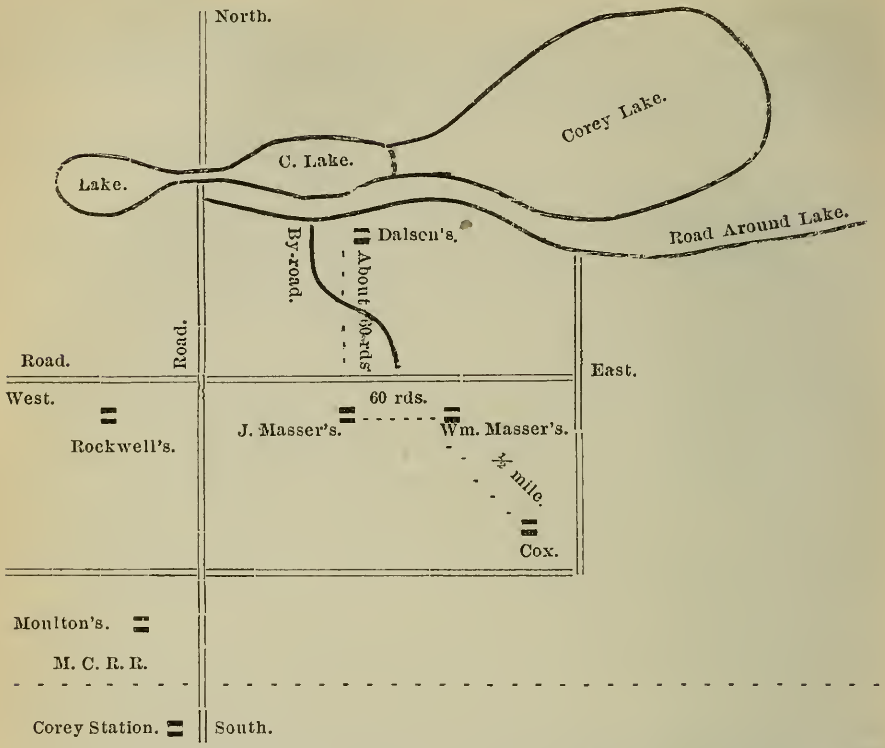
You ask the reason why adults do not have diphtheria while under the same conditions? I would say that diphtheria, while not entirely an infantile disease, still finds more victims in children and young persons; but older persons *do* have it, though possibly not aware of anything more than slight fever for 24 hours and perhaps headache, with or without a knowledge of a sore throat. I am informed by a physician who has made considerable study of outbreaks of diphtheria, that he has seen men with their throats completely filled with membrane come into town from the country and go from store to store to do trading, etc. In this manner, I think, the disease is frequently spread by adults, who have only *sore throats* and do not stay at home.

I also send you some copies of a document on the "Restriction and Prevention of Diphtheria." These should be freely distributed throughout your jurisdiction. * * * *

Very respectfully,
HENRY B. BAKER. *Secretary.*

The following reply was received from Dr. Schurtz:

There was *no* connection between the Dalson and Swift families. There was a public funeral over corpse of Charlotte Dalson, but as Wm. Masser's family were down at the time, and as the date of attack of Charlotte Dalson and Herbert Masser was the same date, viz., September 5, it could not arise from that; and as C. Cox was taken on September 6, of course he did not contract the disease here. The Cox family did *not* attend funeral; but *very* few were present. I did *not* carry the disease, as they were all down with it on my first visit; also I have a child 3½ years old, and treated from 4 to 12 cases every day and did not bring it home, as my child escaped. Disinfectants were used and all communication prohibited as far as possible so as not to spread the disease. After the first death the other corpses were buried privately and *in a very short* time after death.



Above is a map representing somewhat the location of the families first taken. [The territory east of the road running north from Corey Station is in the township of Fabius, St. Joseph Co.—H. B. B., Sec. S. B. of H.]

Respectfully submitted,

Newburg, Cass Co., Mich., March 3, 1880.

R. SCHURTZ, M. D.,
Health Officer of Township of Newburg.

DIPHTHERIA ATTRIBUTED TO CLOTHING NOT PROPERLY DISINFECTED.

There have been six cases of diphtheria in this township (Scipio). One has died, two have recovered, and three are sick now. I think all of them, except one, together with some ten or twelve cases in Pulaski, can be traced to a starting point in Pulaski of some clothes not properly disinfected. * * * There have been, I understand, three cases of scarlet fever in town, one of which proved fatal. * * * *

Yours truly,

Mosherville, Nov. 8, 1879.

E. A. BAGLEY, M. D.,
Health Officer of Scipio, Hillsdale Co.

SIX CASES OF DIPHTHERIA IN ONE HOUSE IN WEBBERVILLE, MICH.

Below you will find reports of cases of diphtheria of a malignant type which occurred in one house in this place during the present season.

No. 1.—Artie B., aged 5 years, taken sick August 17, died August 24.

No. 2.—Myrtle B., aged 3 years, taken sick August 19, died August 24.

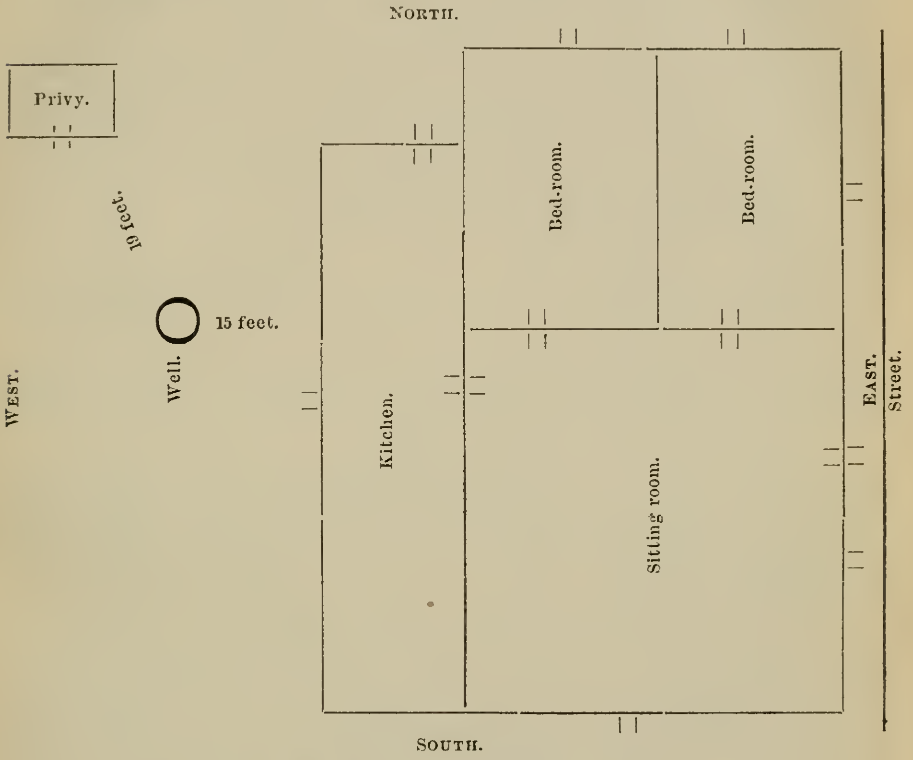
No. 3.—John B. (father of No.'s 1 and 2), aged 30 years, taken sick August 28, recovered Sept. 15.

After this the house remained unoccupied for several weeks. It was also thoroughly cleansed and disinfected. Oct. 23 Samuel A. and family, consisting of himself, wife, two boys and a girl aged 9, 8, and 3 years respectively, moved into the house.

Nos. 4, 5, and 6.—November 20 three of the family were taken sick with diphtheria, viz., Samuel A., aged 37 years, Samuel A., Jr., aged 9 years, and Martin A., aged 8 years.

These cases were also of malignant type of the disease. They all made good recovery in from ten days to forty-five days. On examination I found the privy but nineteen feet from the well, and this has been the situation for several years. (See diagram.) The soil is a gravel and sandy loam with a stratum of clay beneath. The well is about 25 feet deep, and is easily affected by drouth or heavy rains. The privy stood over a pit two or three feet deep. As soon as I made an investigation of the premises and found this condition of the surroundings, I ordered the family to discontinue the use of the well entirely, move the privy 100 feet from the well if possible, clean out the pit and throw in at least a bushel of lime and ashes. Since that time the family have been in good health.

House in Webberville, Mich., where occurred six cases of Diphtheria in two families.



House one story high.

Two neighbors of the above used water from this well and had several cases of diphtheria in each family, but of a milder type. There have been quite a large number of cases of this disease in the surrounding country that could be traced to no such cause. Had this particular well anything to do with the sickness of the above-mentioned cases, or was it simply an epidemic influence? I have had no chance to get an analysis of the water.

Yours respectfully,

Webberville, Ingham Co., Mich., January 27, 1880. R. B. SMITH.

In reply to questions concerning the above cases, Dr. Smith wrote as follows:

I cannot trace the connection of the cases referred to to a previous case. The previous cases were in the eastern part of the village and there was no communication between the parties. I have made an investigation and cannot learn the exact amount of disinfecting material used. Chloride of lime and sulphurous acid gas were both used in all the rooms. The privy was not disinfected till after the cases in the second family were well or convalescent. Square room 14x15 ft.; one bedroom 8x8 ft.; one bedroom 7x8 ft.; height 9 ft. I also learn that there were not all the means used that I ordered, and as I was very busy at that time I trusted to the parties to carry out the order, which, through carelessness and an unbelief in the contagion theory, they neglected, in at least some of the particulars.

Very respectfully,

Webberville, Ingham Co., Jan. 29, 1880. R. B. SMITH.

DIPHTHERIA AT LESLIE, MICH.,—REPORTED BY HEALTH OFFICER.

A diphtheritic sore throat has prevailed here for a week or so. About a dozen cases have occurred. The majority are quite mild, and get along with little treatment; but there have been three severe cases, two having already been fatal. The third case is improving at the time of this writing.

Any suggestions or advice which you may offer will be thankfully received.

Very truly yours, M. S. DOWLING,

Leslie, Ingham Co., Mich., October 30, 1879. *Health Officer of Village.*

SEVERE CASE OF DIPHTHERIA FROM EXPOSURE AT A FUNERAL IN LESLIE, MICH.

We have had several new cases of diphtheria since my last communication, and one death, making three fatal cases in all.

I would be pleased to receive a little further advice relative to holding funerals. The last case which resulted fatally was a very bad one, and I protested against a public funeral, and especially to its being held in the house where the patient died. However, no attention was paid to the remonstrance. The law, as I understand it, cannot be appealed to in such cases. Not only that, but the attending physician and friends allowed young people and others to go in and view the body. One desperate case has resulted from exposure to the above mentioned case.

Now, what is my duty in such cases? Also, can I lawfully insist on putting up a card of warning on the house where cases of contagious diseases may exist?

Please let me hear from you soon in relation to above. Respectfully yours,

Leslie, Ingham Co., Mich., Nov. 6, 1879. M. S. DOWLING, *Health Officer.*

Section 1732, compiled laws of 1871, requires the board of health to give public notice of infected places. It is as follows:—

(1732.) SEC. 41. When the small-pox, or any other disease dangerous to the public health, is found to exist in any township, the board of health shall use all possible care to prevent the spreading of the infection, and to give public notice of infected places to travelers, by such means as in their judgment shall be most effectual for the common safety.

DIPHTHERIA SPREAD FROM A FUNERAL.—REPORTED BY S. P. DUFFIELD, M. D.

We have been having an epidemic of diphtheria, emanating from a case which had a public funeral, and was not treated as it should have been, by declaring it positively contagious. Some of our doctors here, strange as it may seem to you, do not endorse the theory of contagion; but the people, now frightened, begin to listen to me, whom these M. D.'s sneered at because I was following all the advices laid down by the State Board of Health. Yours truly,

Dearborn, Mich., Feb. 3, 1879. SAMUEL P. DUFFIELD, M. D.

MALIGNANT DIPHTHERIA ATTRIBUTED TO EMANATIONS FROM A DRY LAKE.

I have been in practice here over one year. My ride lies east of a small body of water known as Ottawa Lake, a shallow body of water, over three miles in length and two in breadth. About once in four or five years this lake is entirely dry, commencing in August and continuing so until the fall rains, and sometimes longer. The prevailing winds during this time are west and southwest. This summer it began to dry up in August, and by the last of September it was entirely dry, leaving a large amount of decaying vegetable matter, also a large number of fishes, to rot, and I think to cause a vast amount of sickness by the deadly malaria arising therefrom and carried by the winds into the vicinity east and northeast. When it began to dry the sickly season opened, and since that time diphtheria of the most malignant type, also typhoid fever has raged over a tract of land of about one-half of the township. The result is a frightful mortality. It is my opinion that this malaria has contributed to the cause of *malignant diphtheria.* Respectfully,

Whitford Center, Monroe Co., Mich., Oct. 20, 1880. DR. MONT CASSIDAY.

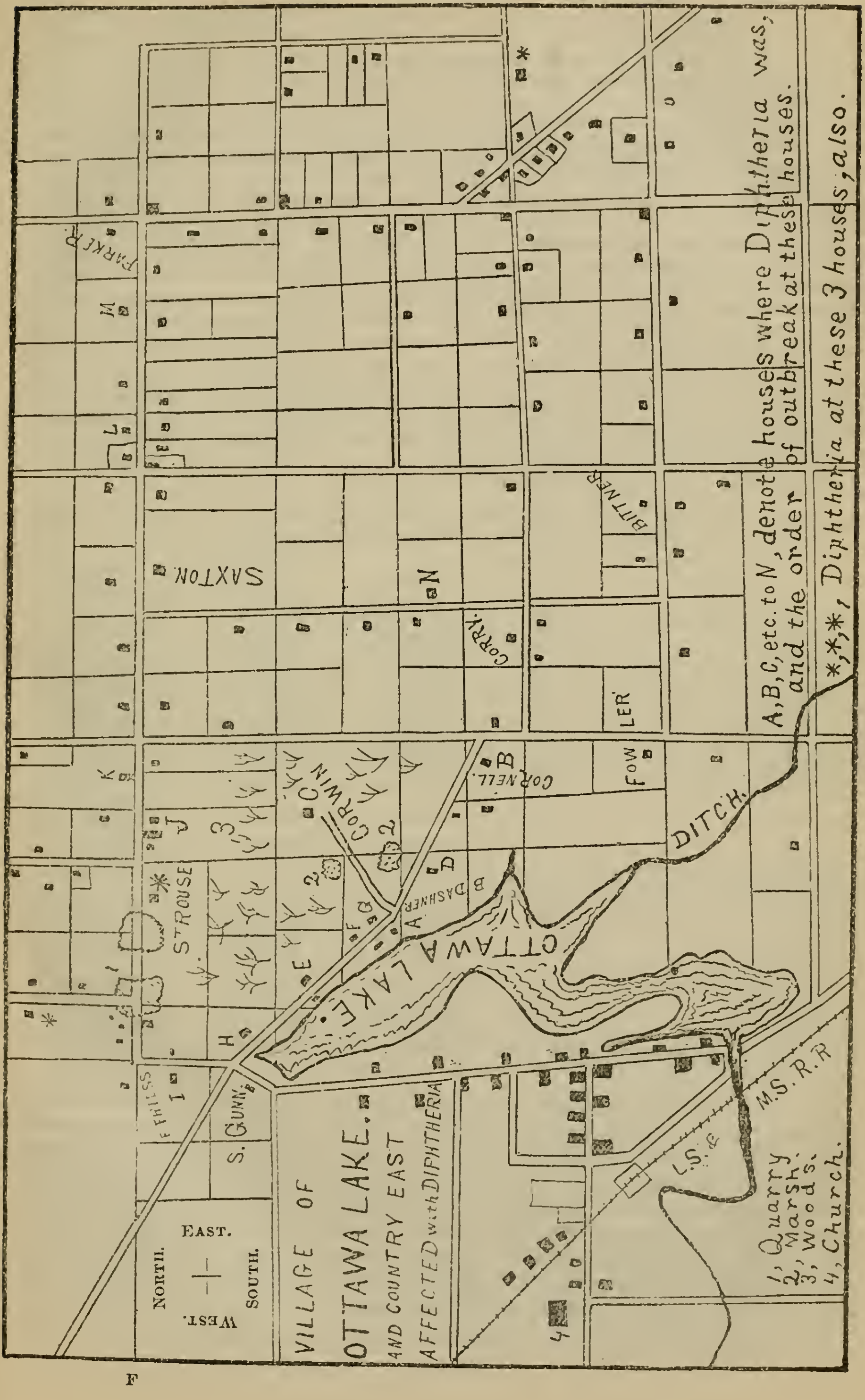
A more complete report of this outbreak of diphtheria was afterward received from Mr Cassiday, through Dr. Hal C. Wyman, of Detroit; it follows herewith.

DIPHTHERIA IN THE COUNTRY EAST OF OTTAWA LAKE, MONROE CO., MICH.

(*Reported by Mont Cassiday, Student of Medicine, Detroit Medical College.—Submitted by Hal C. Wyman, M. D.*)

Diphtheria, in its most typical form, made its appearance in the country east of Ottawa Lake, town of Whiteford, Monroe, Co., Mich., Aug., 15, 1879. This was the first epidemic known in the locality for fifteen years. At that time diphtheria was epidemically prevalent. The total number of souls in the district infected was 250, of whom 27 had the disease and seven died. Of the remaining twenty, six had it lightly and fourteen severely. Two fatal cases had hemiplegia. Three of the convalescent cases have paralysis. In all of the cases there was a well-defined, visible, and palpable exudate in the fauces, and extreme prostration of the physical powers.

DIPHTHERIA IN WHITEFORD, MONROE CO., MICHIGAN.



By reference to the map herewith submitted it will be observed that the country for miles about the infected district is well populated. On the west side of the lake is a village of three or four hundred people, but on that side of the lake there was not a case of the disease. The country about the eastern shores had been settled thirty years, while that on the western shore has only been settled about fifteen years. The prevailing winds are from the west and southwest, sweeping across the lake over the locality where the disease prevailed. The lake is peculiar in that it will once in two or three years go dry, leaving a tract three miles long and one and one-half wide covered with a dense carpet of water plants in which are entangled various aquatic animals exposed to decomposition. In the banks of the lake may be studied the geological history of the country. The bottom of the lake is sandstone. In the banks above the sandstone is found some limestone, and above this is two to four feet of clay and alluvium. Near the lake are quarries, worked for both lime and sandstone. The direction of the strata in the banks and bottom of the lake is equivalent to an angle of twenty degrees with the surface of the water when the lake is full. Owing to this incline in the strata and the presence of limestone, crevices form between the rocks and through them the waters are drained out of the lake. The oldest inhabitant says that when he first came into the country the lake did not go dry so often, and that large fish were often caught in it. During the past fall the lake has been dry. It has been observed that sickness was more prevalent during those seasons when the lake was empty. The stench that filled the air on the east shore during the greater part of the season would incline one to the belief that the decomposition of the organic matter in the bed of the lake had something to do with the prevalence of diphtheria. The fact that there were no cases on the opposite shore, where the families live, so far as households are concerned, under the same hygienic conditions, and that the prevailing winds were from the west across the lake is significant of causal relations between the disease and the decomposing organic matter. Herewith is appended a tabulated list of the cases.

*Record of 27 cases of Diphtheria in Whiteford Township, Monroe Co., Mich., in August, September, and October, 1879.**—BY MONT CASSIDAY.

NAME.	Sex.	Age.	When Taken.	Whether Died or Recovered.	When Died or Recovered.
Zulema Cornell	F.	5	August 15, 1879	Died	August 24.
Willie Cornell	M.	12	August 14, 1879	Recovered	August 25.
Add Cornell	M.	18	August 20, 1879	Recovered	August 29.
Katy Dashner	F.	2	August 28, 1879	Recovered	September 5.
Gertrude Dashner	F.	8	August 30	Recovered	September 21.
Rosa Dashner	F.	10	August 31	Recovered	September 12.
Joe Dashner	M.	12	August 31	Recovered	September 4.
Johnnie Dashner	M.	6	September 2	Recovered	September 9.
Julia Dashner	F.	14	October 14	Recovered	October 25.
John Turk	M.	13	September 2	Died	September 13.
Bert Corwin	M.	14	August 28	Recovered	August 31.
John Watson	M.	8	September 30	Recovered	October 20.
Lillie Watson	F.	6	September 31	Recovered	Oct. 28, partial, with locomotor ataxia.
Ella Poling	F.	12	October 17	Partial recovery	Paralyzed.
Charlie Poling	M.	6	October 25	Died	October 26.
Mrs. S. Jones	------	----	----------	----------	----------
Cynthia Jones	------	----	----------	----------	----------
Etta Tabot	F.	20	September 18	Recovered	October 15.
Henry Tabot	M.	18	September 20	Recovered	October 19.
Willie Tabot	M.	14	September 20	Recovered	October 20.
George Tabot	M.	10	September 22	Recovered	October 25.
Mrs. Smith's child	------	----	----------	Died	----------
Julia Rabideau	F.	8	November 3, 1879	Recovered	November 15.
Joe Rabideau	------	5	November 3, 1879	Recovered	November 17.
Charlie Thornton	M.	----	October 14, 1879	Recovered	November 21.
Cora Strouse	F.	----	October 3, 1879	Recovered	October 15.
Sylvia Fress	F.	----	October 4, 1879	Recovered	October 20.

*Dec. 10, 1879.** MONT CASSIDAY.

In the acknowledgement of the preceding report, the order of occurrence of the disease at the several houses was asked, and the number of cases at each house. The reply as to order of occurrence has been incorporated in the map by means of the letters A, B, C, etc., indicating the houses at which diphtheria occurred, and the order of outbreak at the several houses thus marked. Marks on another map indicated diphtheria also at the three houses marked on this map with an *, but the order of outbreak was not stated. The following questions also were asked of Dr. Wyman and Mr. Cassiday, to which Dr. Wyman gave the replies following the questions.

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* [The date of Mr. Cassiday's first letter, on page liv, should be printed October 20, 1879, instead of 1880.]

"1. Can you give the origin of the *first* case? How the disease was contracted? Where was it contracted?

"2. When a case was severe were other adult members of the family sick with a fever for about 24 hours, accompanied with a headache, with or without a mild sore throat? (This is generally the case.)

"3. Can you trace the spread of the disease by adults, who, though not severely sick themselves, yet conveyed the disease to other persons, as, for instance, to children in their own family?

"4. Can you trace every case to exposure to something which had come directly or indirectly from a previous case?

"5. Was the disease considered by the people to be communicable, and were any precautions taken to prevent it from spreading?

"6. Can you in any way trace a connection between the wells used as the source of the water-supply of the people and the waters of the lake, either by direct underground streams or by filtration?

"7. If due to the water why did the disease prevail for so long a time, new cases appearing from time to time from Aug. 14 to Nov. 3? Very respectfully,

HENRY B. BAKER, *Secretary*."

REPLIES BY DR. H. C. WYMAN TO THE PRECEDING QUESTIONS.

In conversation with Mr. Cassiday I learned in reply to your several questions, as to the origin of the first case, etc., that it occurred at Mr. Jones' ("A"), was erroneously diagnosed by a physician, who styles himself a "root and herb eclectic doctor," *scarlatina sine eruptione*, was contracted at home. The second cases "B" occurred in a family that assisted in the care of the first case. All of Jones' family were sick with fever, but none of them had more than slight sore throat. In the family of the second case the mother and father had sore throat and chills.

In all the families where severe cases occurred (such as appear in the table), other persons complained of sore throat. Only such cases as had well marked exudation of white material in the throat, were pronounced diphtheria.

The Corwin family, "C," evidently contracted the disease through the mother, who assisted in the care of family A and B, remaining with them through the day and returning home to her own family at night. In other families the disease seems to have been conveyed in the same way.

After six families had become infected the disease broke out in other families that had established a rigid quarantine, so that atmospheric conditions must have had something to do with the spread of the epidemic. Wells in all cases except one, were from thirty to ninety feet in depth In the exceptional case (family "D" on map), no well existed. Some water was obtained from neighborhood wells, but most was taken from that part of the lake that was last to go dry.

The evidence points to poisoning of the air by the decomposing matter in the bed of the lake. If the first case was caused by bad air all those cases occurring after the sixth one must have had a like origin. We can't get around the fact that the drying up of the lake seeems to have been a cause of the disease.

Detroit, Mich., Dec. 16, 1879. H. C. WYMAN.

CASES OF DIPHTHERIA NEAR A MILL-DAM.

There have been twelve deaths in this township of Frenchtown, all of diphtheria, between three and twelve years old. I suppose it was on account of the mill-dam, because the most of them lived near the mill-dam. I have lived three years in that place and was sick one-half the time, and moved five years ago and not a day of sickness since.

Monroe, Mich., Dec. 4, 1879. MANROD LA PRAD.

DIPHTHERIA IN GRAND RAPIDS, KENT CO., ASSOCIATED WITH CONTAMINATION OF A WELL, ETC., BY A SEWER.

In regard to the two cases of Diphtheria that occurred in the summer of 1878, in my house,* I have failed to trace any other origin than the most thorough sewer contamination of lot, cellar, and well.

The only case that occurred in this neighborhood was in May, 1877, on the first lot north of the Diagram, and one hundred feet removed from the cause of the nuisance described. This case was caused by direct contagion from a corpse having died with the disease. She recovered, and from the appearance of things and their statement, they took excellent care to prevent a spread of the disease. Their yard and sewer, connecting with Bostwick street is in good condition. The first child that died in my house * had been ill with malarial trouble some time before it was taken with throat disease, and according to the statement of an intelligent neighbor, mother of the case in 1877, who frequently visited the sick one, no diphtheria was suspected, and the child died with every symptom of brain affection. One week after the death of this one the other one was taken, and both were reported as diphtheria; but Dr. Laubenstein, who treated both the children, said he considered the first malarial fever, and the latter diphtheritic croup, and he had found no other but local causes, though of the existence of the box-drain nothing was known to the occupants until I found it this spring. A diagram of the premises follows herewith.

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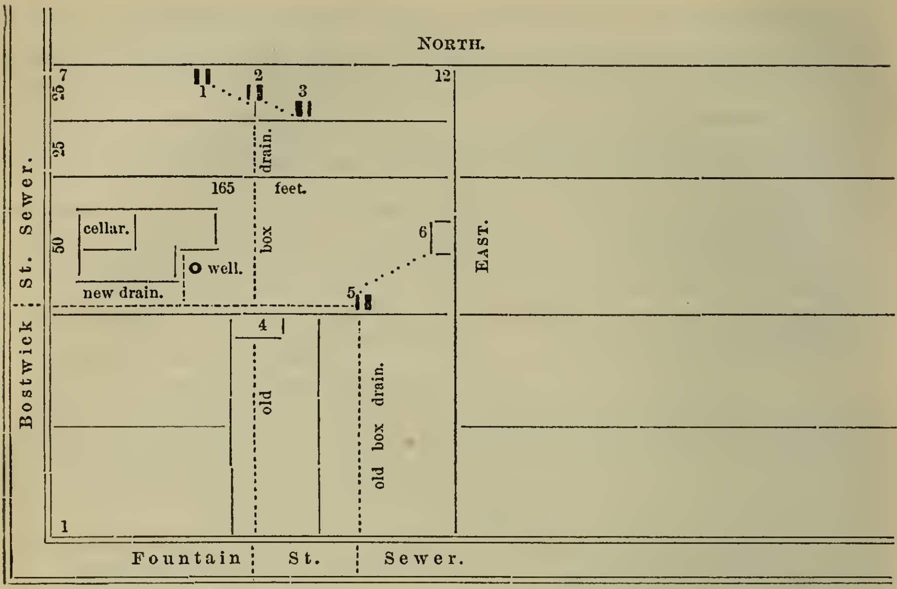
* [Apparently before Dr. Veenboer lived in the house.]



1. Privy, connected with cesspool.
2. Cesspool, receiving privy and spring drain.
3. Large spring used by family.
4. Brick barn, cutting off old box drain, built 6 years ago.
5. Privy on my lot, with old drain in good condition.
6. Barn on my lot.

No. 1, 7, 12, shows declivity.

Grand Rapids, Mich., Aug. 12, 1880. MELLE VEENBOER.

Many of these reports of outbreaks of diphtheria well illustrate the necessity, so often pointed out by the State Board of Health, for distributing among all classes of people in cities, villages, and townships the documents on the restriction and prevention of diphtheria, the blank notices for reporting cases of diseases dangerous to the public health, the sections of law requiring such notices to be made, and the regulations adopted by the local board of health for the protection of the lives and health of those in their care; the necessity for prompt and efficient action by the health officer and the local board of health to enforce both the State law and their own regulations, and in every way to secure among their people such intelligence respecting the causes of sickness and such concert of action that these diseases may either be entirely prevented or at once stamped out on their first appearance. The wail of sorrow that rings through some of these reports, and in others the simple statement of facts that have been attended with unutterable anguish, appeal to all to wage on these diseases a vigorous war of extermination. Until such action is taken throughout the State, these epidemics will be repeated, and no child, however fair or strong or however well guarded by its fond parents, will be safe.

OUTBREAK OF DIPHTHERIA IN TEXAS TOWNSHIP, KALAMAZOO CO., MICH.

DEAR DOCTOR:—I send you herewith a report of all cases of diphtheria which have occurred in this township during the year 1879. The introduction of the disease into this locality was, to say the least, a piece of extreme carelessness.

Mrs. C., mother of the young lady who was first taken down with the disease, went to an adjoining town where she tended a little child which was suffering from diphtheria of very mild form. Mrs. C. came back to her home and within *three days* her eldest daughter was seized with the disease in a mild form. *Two days* afterward the second child was attacked, and the *next day* another case followed. The two last cases were marked as very malignant.

Through carelessness of members of their family the contagion was conveyed to my children. It first made its appearance in the person of my youngest daughter, a bright little child of four summers, whose ever joyous laugh even now seems to ring in my ears. Next my little boy not quite two years old, the baby, with eyes of azure blue. Both cases were of marked severity. Treatment was commenced upon the first inception of disease. Counsel was called at once. The utmost attention was given them. But what availeth the wisdom of man? They died from extreme weakness, induced from the great amount of blood-poison, after suffering just six weeks. Of the other three cases in my family one was very severe; the other two were mild. My eldest daughter had the diphtheria when she was a little past four years of age. It was a very severe case, but she recovered. During the last visitation of the malady in my family, she was seized for the second time with the disease, and although the local lesion was very severe the membrane seemed to be very easily removed. I attribute this to the fact that the true mucous membrane having been destroyed by the first invasion, the second mucous membrane which formed was of different texture (perhaps not so porous), and would not allow as free exudation or as firm attachment of false membrane to its surface.

That the outbreak of diphtheria in this locality might with proper precaution have been prevented I do not doubt. My house was kept thoroughly disinfected and no new cases originated therefrom. Proper restriction of intercourse between the infected and non-infected will certainly prevent the spread of the contagion. Proper disinfectants should not be neglected. My experience is in favor of chlorinated soda and fumes of sulphur. Yours truly,

Texas, Kalamazoo Co., Mich., Feb., 1880. A. S. MARTIN, M. D.

May 31, 1880, Dr. H. P. Sigler, health officer of Putnam township, Livingston Co., sent to Dr. H. F. Lyster, of Detroit, a member of the State Board of Health, the following notice of an outbreak of diphtheria near Pinckney. The communication was forwarded to this office, copies of the document on the Restriction and Prevention of Diphtheria and other documents were sent to Dr. Sigler, and he was requested to make a special report of the cases, relative to means of communication, the period of incubation, and the sickness of other persons in the same family. His report follows the letter to Dr. Lyster.

OUTBREAK OF DIPHTHERIA NEAR PINCKNEY, MICH.

Pinckney, Mich., May 31, 1880.

DEAR DOCTOR:—We are in the midst of an epidemic of diphtheria, and the extremely rapid and malignant course of the disease has led me to make some inquiries among professional friends. All of our cases thus far have been children from 2 to 8 years of age. The symptoms are as follows: They have a chill, followed by a high fever, pulse 140°, temperature 105° F., (this in a patient 3 years of age, the others correspond); this high temperature lasts about 24 hours, when the surface heat falls below normal. As soon as fever sets in the fauces are dark red, and in a few hours (generally three) the membrane begins to form, and forms so rapidly that its course can well be marked from hour to hour.

The nasal passages soon become affected and the cervical glands swell rapidly. The duration of the disease has been from two days to four and one-half days. The odor is bad from the first. They have all died from *asthenia*. The treatment has been quinine, chlorate potash, tincture iron and brandy. Have used for local spray carbolic acid, alcohol, and in fact have exhausted all our remedies.

Please favor me with your opinion as to *prognosis* and treatment of this form of the disease.

The above is a true representation of the disease, and not overdrawn. Have you had such cases and what number recover? Yours fraternally,

H. F. Lyster, M. D., Detroit, Mich. H. F. SIGLER, M. D.

June 17, 1880, Dr. Sigler wrote as follows:—

Four families have suffered with the disease and I can connect but two of them with the first cases. I will mail you a history of the cases as soon as possible. The disease appears to have been hovering around this vicinity since October, 1879. No cases have occurred since death of last Farley child, June 9. I have taken great pains to isolate the cases, which I think has prevented the further spread of this terrible disease. Nine children had the disease with but *one* recovery. A large number of physicians saw the cases, but all agreed that they had never seen anything to equal it in its malignancy.

The following special report was received June 24, 1880:—

SPECIAL REPORT OF THE FOREGOING OUTBREAK OF DIPHTHERIA NEAR PINCKNEY, LIVINGSTON CO., MICH.

CASES IN 1879.

Case 1.—In October, 1879, a young lady came home from a neighboring village (distant about thirty miles) sick with the disease. The disease ran a mild course and terminated in recovery on the eighth day. No other cases occurred in this family.

Cases 2-5.—On the 26th of November, 1879, the disease appeared in the family of T. F. Bigg, distant one mile from case No. 1. The disease appeared in this family on the forty-fourth day from date of recovery of case No. 1. I could trace no source of contagion. Four children suffered with the disease and one resulted fatally.

Case 6.—In the latter part of December, 1879, the disease appeared in the family of Joseph Placeway, in the adjoining town east, distant eight miles from previous cases. Mrs. P. had been nursing a distant relative suffering from this disease, and came home having a *slight sore throat* at the time. I found on my first visit well-marked symptoms of diphtheritic inflammation in her throat.

Case 7.—Their only child took the disease and died on the fourth day. In this case the membrane extended into the larynx, as it did also in the fatal case in Mr. Bigg's family.

No other cases occurred during the next three and one-half months in this vicinity.

FIRST SERIES OF CASES.

(*Family of Samuel Gilchrist, harness-maker.*)

Locality.—Southern edge of village of Pinckney; soil sand and gravel; situation, high, sheltered.

House.—Old, five rods from other houses; ground slopes to the south; living-room lighted by three eight-glass windows; exposure eastern. Family had lived in it four years; no previous history of diphtheria connected with the house. Cellar under living-room, opens into kitchen; clean and dry, but has no ventilation; stone wall and water-lime floor plastered on the ground; vegetables have not been allowed to decay in it; cleaned once a year and walls whitewashed; no disinfectants are used. Fuel, wood, generally kept out doors.

Water-supply.—Drinking-water from drive-well on the premises; clear and good to the taste; well 14 feet deep, with 24 inches of water; cistern-water used for washing.

Privy.—Over a pit not walled; never cleaned nor moved since built, some 12 years ago; 20 feet from well.

Persons sick.—(*Case 8.*) Lizzie Gilchrist, aged 10 years; attacked April 27, 1880: first attack, symptoms—chill, fever, temperature 105° F., vomiting, rapid formation of membrane, very fetid after first twelve hours; swelling of cervical glands and invasion of nasal passages. Duration of disease 5 days. Died.

Concerning Contagion.—The family do not believe that the disease was derived from contagion· I have made persistent inquiries, and I have failed to discover that the disease was derived in that way.

Subsequent Cases.—(*Cases 9-12.*) May, aged 5 years, sickened with the disease April 29, and died May 2. Freddie, aged 3 years, sickened April 30, and died May 3. Willie, aged 8 years, sickened May 1 and died May 5. Mr. and Mrs. Gilchrist escaped the disease. None of the above children complained of any soreness of the throat or pain whatever, and on being asked as to their feelings would say: "I am well, only so tired."

SECOND SERIES OF CASES.

(*Family of ——— Clark, a farmer.*)

Locality.—Country, 3½ miles from Pinckney; soil, sand and gravel; situation high, sheltered.

House.—Frame, old, and one-half mile from other houses. No previous history of diphtheria. Rooms large, well lighted, and airy. Cellar under kitchen, clean and well ventilated; no decaying vegetables; cleaned twice a year.

Water-Supply.—Drinking water from well 25 feet deep, tub at bottom, curbed with stone.

Privy.—Over pit in ground, and has not been moved for 6 years; 18 rods from well.

Persons sick.—(*Case 13.*) Eleanor Clark, aged 24 years. Principal symptoms, throat-trouble. Disease ran 9 days, recovery.

Concerning Contagion.—This case doubtless had its origin from contagion. She came to Gilchrist's May 4 to assist in caring for Willie, the last Gilchrist child, and remained till the evening of the next day. She was attacked with the disease May 9, making the period of incubation about 4 days.

Additional cases—(*Case 14.*)—I am informed that a younger sister had a slight sore throat and some fever, but recovered in a few days.

THIRD SERIES OF CASES.

(*Family of James Tiplady, a farmer.*)

Locality.—One-half mile from Clark family: soil, sand and gravel; situation dry.

House.—New frame house, rooms high and well lighted; exposure north; no previous history of diphtheria. Cellar under living-room, ventilated by two small windows, damp but no decaying vegetables. They have burned sulphur in cellar once a day since first appearance of disease in the Gilchrist family. Fuel, wood kept in a pile three rods from house, large amount of decayed chips about wood-pile.

Water-supply.—Well, 26 feet deep; tub in the bottom and bricked up; well secured from surface water. I noticed quite a number of pieces of boards and rubbish floating on the water.

Privy.—Over a pit in the ground, 23 feet from well, built one year.

Persons sick.—(*Case 15.*)—Bernard, aged two years, was attacked with the disease May 28. Symptoms, chill, fever, vomiting. Principal symptoms throat-trouble. Disease ran five days; fatal.

Concerning contagion.—The family say that there is no reason to believe that the disease was derived by contagion; but upon careful inquiry I found that Clark's hired man came to Tiplady's house one night on an errand during the early part of the Clark woman's illness, and that he passed through the room where the children were sleeping. He had been in the sick room at Clark's frequently. If the disease was derived in this way the period of incubation was about 17 days.

Additional cases.—(*Case 16.*) Willie, aged 4 years, was attacked with the disease June 6. Disease ran 8 days; recovery. No adults were attacked with the disease.

FOURTH SERIES OF CASES.

(*Family of Michael Farley, a farmer.*)

Locality.—In the eastern and northern part of this township fully 5½ miles from previous cases. I was not able to examine the premises, but am informed by the attending physician that he made a careful examination of the premises and found nothing that would in his opinion be looked upon with suspicion. I questioned Mr. Farley as regards the origin of the disease, but could learn nothing that would lead me to think that the disease was derived from contagion. The family consisted of father, mother, and three children.

Persons sick.—(*Cases 17-20.*) Rosa Ann Farley, aged 3 years, was attacked with the disease June 2, and died June 5.

Edward Farley, aged 9 years, was taken June 5 and died June 7.

Katie Farley was taken June 5, died June 9.

Mrs. Farley had a light attack of the disease.

Cases of pharyngitis and quinsy have been quite common during the winter and spring. I have attended a large share of them and seen several in the practice of others, but none of them presented any of the characteristic symptoms of diphtheria. I have been particular to observe in the history of the above cases whether they had had any communication with persons suffering with "sore throat," but with negative results.

Pinckney, Livingston Co., Mich., June 28, 1880. H. F. SIGLER, M. D.

A CASE OF DIPHTHERIA,—REPORTED BY E. P. CHRISTIAN, A. M., M. D., OF WYANDOTTE, MICH.

The following case of diphtheria, to me, manifested so unusual a course, that I have considered it worth rendering briefly its history.

Mrs. D., a maiden lady, age 40 years, came to consult me, August 12, about a swelling under her left ear. This enlargement of the gland was about the size of a walnut, hard, not discolored, and with no indications of impending suppuration. The swelling itself was not very painful, but there was severe pain in the ear and over the temple; no pain in swallowing, but complains of a feeling as if there was a pimple in her throat. There were no sores on the scalp nor inflammation in the ear, to account for the swollen gland. Examination of the throat showed nothing abnormal except a slight enlargement of left tonsil, which it was supposed occasioned the sensation of a pimple, as she expressed it, in the throat. This condition, she said, had existed since July 18, at which time she came to Wyandotte from Ontario on a visit. She was anxious about this tumor, to know what it was and to get rid of it. She had no fever at this time, nor had she had any since the appearance of the swelling.

August 16th, four days after, and a month lacking a couple of days from the appearance of the swelling, I was called to see the patient, and found a fully developed malignant case of diphtheria,—whole fauces violently inflamed, and thick membrane covering left tonsil and adjacent parts, with great prostration. I told the patient she had the diphtheria, when she stated that four days before leaving home, on July 14th, she had been to the house of a friend where a child had just died of that disease. The patient, in addition to the throat affection, had a papular eruption coming out somewhat generally on the body, but more thickly over face, hands, and legs. These were from the size of a pin-head to that of a ten-cent piece. The patient slowly but steadily improved. In ten days the patient was convalescent, with diphtheritic membrane entirely gone, soreness of fauces disappeared, the papules having gradually dried up and desquamated, their disappearance going on *pari passu* with the disappearance of the membrane, except a few on the lower extremities, which assumed a furuncular appearance and suppurated, and gradual lessening of the enlarged gland.

The peculiarities of this case which we have thought worth detailing, were the long period of latency of the disease, as far as the manifestation of constitutional symptoms and the pathognomic throat symptoms, and the cutaneous eruption indicating the thorough impregnation of the system during this period of latency. This is the only case I have knowledge of occurring in this vicinity for some months.

Wyandotte, August 31, 1880. E. P. CHRISTIAN, M. D.

Many attempts have been made to prevent diphtheria in those exposed to it, by giving them medicine. While the evidence of the prevention of diphtheria in this way is not yet conclusive, and from the nature of the case is very difficult to obtain, it is proper to consider such evidence as is presented. It should be remembered, however, that no such preventive doctoring can remove the necessity for constant care to keep children away from the disease and to destroy the virus of the disease wherever found. Even if such preventive medicines may be made successful in cases of known exposure, they do not meet the many cases of unknown exposure. The following instance of the giving of muriate of iron as a preventive medicine is reported by Dr. Christian, of Wyandotte. It is followed by a request from Samuel Craft, Supervisor and President of the Board of Health of Deerfield township, Isabella county, for knowledge of some medicine preventive of diphtheria, which request may serve as a sample of others received. A preventive for diphtheria, similar to vaccination for small-pox, may yet be found. It cannot be said that it has been found.

A little girl 7 or 8 years of age was continuously exposed up to day of diphtheritic eruption in throat. She was then excluded from the room and put on use of tinct. chloride of iron and chlorate potassa mixture as long as the patient continued in the house, as was also the sister of the patient who attended to her. There were others exposed before the the outbreak, but no others after. There has been no other case. The child continues well, having been watched with much anxiety and interest. Yours very truly,

Wyandotte, Wayne Co., Mich. Sept 3, 1880. DR. E. P. CHRISTIAN.

REQUEST FOR A MEDICINE PREVENTIVE OF DIPHTHERIA.

Diphtheria is prevailing in my township to an alarming extent. I write you to ask you for any information you may be able to give. Also, is there any preventive? If you have any general treatment please let me know by return mail. Can the system be prepared by any particular course of medicine so they will have it less severe? Let me hear from you immediately.

Mt. Pleasant, Isabella Co., Mich., July 28, 1880. S. CRAFT.
President of Board of Health for Township of Deerfield, Isabella County.

OUTBREAK OF DIPHTHERIA IN LANSING AND MERIDIAN TOWNSHIPS, INGHAM CO., MICH.

There has a disease made its appearance in the towns of Meridian and Lansing that Dr. Bailey calls diphtheria. It seems to be contagious. It appears that Mr. L. M. of the town of Meridian (who lives near the town line between Lansing and Meridian) had a child taken sick with a disease of the throat; it was sick but a few days and died. Mrs. Neff's boy, 8 years old, was living at Mr. M.'s, was taken sick June 18, and died June 28. They moved the child during his sickness to the house of his grandfather, Mr. McRarin, one mile south of Mt. Hope Cemetery, in the town of Lansing, where his mother took care of him, she having a child 4 years old that lived in the same family. The child was taken sick June 20 with same disease; and the mother was taken sick on Monday, June 28, and is now dangerously sick. I visited the places in question yesterday, and requested them to use all diligence to prevent the spread of the disease, leaving at each house a copy of your pamphlet on Restriction and Prevention of Diphtheria. The schools were closed on Saturday, June 27. I will see that the report is made in due time.

Respectfully yours, GEO. W. PARKS.

Lansing, Ingham Co., Mich., June 29, 1880. *Clerk Ingham Township, Ingham Co.*

In connection with the request for copies of the document on the Restriction of Diphtheria, contained in some of these communications it is proper to say that the State Board of Health has not sufficient copies, or funds to procure sufficient copies, to supply local boards with what they need for free distribution. A few copies are sent to every local board of health to let them know that they need it. The document may always be obtained of W. S. George & Co., Lansing, with whom the State Board of Health has left the stereotype plates for convenience of local boards, at terms stated on the back of the document, cash to accompany the order. Delay in obtaining a supply may often be avoided by ordering direct from W. S. George & Co., rather than of the State Board of Health.

OUTBREAK OF DIPHTHERIA IN WHEATLAND TOWNSHIP, MICH.

I would like to procure Dr. Hitchcock's pamphlet [Restriction and Prevention of Diphtheria], for distribution in the township of Wheatland, which is stricken with diphtheria—some 20 deaths, and still raging. Can you mail to my address as below, some two dozen or more of the pamphlets? Shall have meetings called in all the school-houses, and have the "Restriction and Prevention of Diphtheria" read and given to some of the heads of families, or nailed to the school-house door for the benefit of the public. Yours respectfully,

Millbrook, Mecosta Co., Mich., Aug. 30, 1880. THEO. W. ROBBINS,
President Board of Health, Township of Wheatland, Mecosta Co.

DIPHTHERIA AT EAST SAGINAW, MICH.

In January, 1880, the following letter was received from Ferd A. Ashley, city clerk and clerk of the board of health of the city of East Saginaw. It is followed by the enclosures to which it refers, being a synopsis of the proceedings of the adjourned meeting of the East Saginaw board of health, held Jan. 16, 1881, and reported in an East Saginaw paper, and containing the report by the health officer, the report by the superintendent of schools, and the communication from resident physicians of East Saginaw.

East Saginaw, January 17, 1880.

Henry B. Baker, Secretary State Board of Health, Lansing:

DEAR SIR:—At a meeting of the board of health of this city, held January 5, 1880, a resolution was presented, citing "that owing to the prevalence and increase of diphtheria it was deemed prudent as a sanitary measure to temporarily close the primary departments of our public schools."

This resolution was referred to a committee consisting of five of our most prominent physicians, who after a careful consideration of the subject reported (January 12) to the board that in their opinion it was advisable not only to temporarily close the public schools, but also the private and Sabbath-schools. This report was on that date received and ordered filed, and made the special order for last night, and I was instructed to give public notice and invite the attendance of the board of education, physicians, and persons having control of private schools, which was done.

The board accordingly met last evening and a full discussion was had of the report referred to, the members of the board of education seeming to be almost if not quite unanimously opposed to closing of the schools under their control. I enclose you a synopsis of the debate, which although not a full one, yet will serve as a guide for your consideration. As you will notice, a resolution formally ordering the closing of public and private schools was presented and laid upon the table until Tuesday evening, Jan. 20, at which time action will be had. In the mean time I was directed to write you and request your views on the subject after you should have read the reports of the health officer, the superintendent of schools, and the communication of the physicians—all of which will be found in the enclosed slip.

We would like you to answer,—

1st. Whether, upon the showing made, taking in consideration the objections set forth by those opposed, you are of the opinion that it would be advisable as a sanitary measure for this board to try the experiment of closing the schools temporarily?

2d. To what extent is diphtheria contagious from exhalations in crowded rooms, even if ventilated as well as circumstances will allow?

3d. To what extent is diphtheria now prevalent in the United States and in other portions of this State?

4th. Do you know of any cities or towns which have closed schools on account of prevalence of contagious diseases, and, if so, what was the effect in regard to the spread of the contagion?

Any other information which may occur to you as of importance in deciding this question will be duly appreciated.

It will be necessary for you to answer at once, in order that I may receive same by Tuesday evening. Very respectfully,

FERD A. ASHLEY, *Clerk of Board of Health.*

The following is an abstract from the synopsis of proceedings at a meeting of the East Saginaw board of health, which accompanied the foregoing letter:

SYNOPSIS OF THE PROCEEDINGS OF THE ADJOURNED MEETING OF THE BOARD OF HEALTH HELD LAST EVENING [Jan. 16, 1881.*]

The board met pursuant to adjournment with President Welch in the chair and 12 aldermen present.

The minutes of the meeting held January 12 were read and approved, and upon motion of Ald. Bartow the recommendation offered by the committee at the last meeting in regard to closing the schools was brought up, and an invitation extended to any present to take part in discussions or give their views in regard to it. Ald. Loveland called for Prof. Jones, who took a decided stand against the closing of the schools, and citing several reasons therefor, and claiming that there was less danger for children who attended the schools, owing to the fact of the care taken by the teachers of them than there would be for boys congregating on the ice and on the streets, as they would be if the schools were closed.

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* From an East Saginaw paper of Jan. 17, 1881.

E. Saunders, president of the school board, gave his opinion that there was no necessity for closing the schools, owing to the precautions that had been taken to prevent the spread of the disease. He gave an illustration at point that at Monroe scarlet fever had been prevalent, but that upon the advice of well-known physicians in that city the schools were not closed, and the disease finally abated.

Mr. Geo. B. Brooks, who had visited several of the schools, was called upon, and responded that he had, upon visiting the different rooms, taken down the number of cases that had occurred in each. * * * He then read the following report, which is signed by ten well-known physicians, residents of this city:

"We, the undersigned physicians of the city of East Saginaw, having been informed that the rules of the board of education requiring all children who have been exposed to or are afflicted with diphtheria, or other contagious diseases, to be excluded from the public schools, are strictly enforced, and that even those who are suspected of being afflicted with such diseases are excluded until the teacher is informed by the attending physician that all danger is passed, and having been informed that great care is taken in ventilating the several school rooms, we are of the opinion that, if our information is true, the spread of diphtheria under such circumstances is less than it would be if the schools were closed.

"J. W. Freeman, B. Hesse, B. L. Cleveland, W. L. Dickinson, D. S. Hall, J. H. Cowell, J. Campbell, J. M. Campbell, M. J. Liddell, A. Farnsworth."

The clerk of the board then read the following report from the health officer, which was received and filed:

"*To the Board of Health of the City of East Saginaw:*

"Gentlemen:—Since my last report for the week ending January 10, there have been 15 new cases of diphtheria in the city, as shown by the report of the different physicians to me. I have kept a record of the number of cases of diphtheria since October 12, 1879. This shows a total of 307 cases. I am satisfied that many cases have not been reported at all, and this report would show a much larger number if all the physicians in the city had faithfully complied with the law.

"Of the whole number so reported, 235 were under the age of 15 years, and 72 were under the age of five years.

"The record kept does not show the whole number of deaths from said disease, but the report kept by the sexton of Brady Hill cemetery shows the interments there from October 12, 1879, to the present time, of 31 persons having died of said disease. The record kept by the sexton of the Catholic cemetery does not show the cause of the death of the persons buried there, but does show the burial of 47 children from September 1 to December 31. Probably the larger portion of these died of diphtheria.

"There were 10 deaths from said disease from July 1 to September 1, this being during the school vacation.

"There were nine deaths from said disease from September 1 to October 12, the time when I com-commenced receiving reports regularly.

Respectfully,
TITUS DUNCAN,
Health Officer."

Dr. Ross was then called for, and responded that he had signed the report that was submitted to the Board at the last meeting knowingly, and that his sentiments were the same as those expressed in the report, but further than that he was not now prepared to state

Dr. Garrigues thought it was advisable to close the schools, as undoubtedly the disease was communicated from one to another.

Dr. Massabacher stated that the disease was at some times misrepresented, and that it was a fact that all the cases in the city had not been reported. It was his experience that there were mild cases of diphtheria that had passed off without the aid of a physician, and that the patients had attended school during the time. These were the cases that were to be feared, as there was danger of their communicating it to others.

Mr. Thompson asked, first, if there was anything in the report showing that the disease had diminished during the late vacation; second, how many cases had been traced to the schools; and third, if some system of examination of the pupils by a physician could not be adopted that would not only check the disease but also prevent the necessity of closing the schools.

Ald. Melchers was in favor of closing the schools, but would like to have some one inform him if any arrangement could be arrived at to close the private as well as the public schools. He had lately visited the cemeteries and found that during the month of December some nine persons had been interred, and up to the 16th of this month some ten more had been buried who had died from this disease. Yesterday he telegraphed to Dr. Kedzie, of the State Board of Health, setting forth the alarming increase of the disease in this city, and asking him if he would advise the closing of the schools, and the following is the reply received by him:

"Lansing, Michigan, January 16, 1880.

H. Melchers:—

"Kedzie at Oberlin, Ohio. On your statement I advise closing schools.

"HENRY B. BAKER,
"*Secretary of State Board of Health.*"

The gentleman further stated that the city would only be at the expense of paying the teachers during the time the schools were closed, and if the life of one child was saved he considered it a cheap investment.

Superintendent Jones at this point submitted the following table in regard to the extent of diphtheria in the schools since September 1, which plainly sets forth the number of cases reported, the number now sick, and the number of deaths arising from the disease:

SCHOOLS.	Number of pupils having had diphtheria since Sept. 1, 1879.	Now absent from school with diphtheria.	Left school since Jan. 1, with diphtheria.	Having died with diphtheria.
Central	10	4	2	0
Potter	32	9	4	0
Crary	11	1	1	1
Hoyt	19	3	0	2
Jones	17	9	0	3
Germania	70	22	20	4
Houghton	21	9	1	4
Emerson	22	0	0	6
Sweet	6	0	0	1
Salina	0	0	0	0
Bellevue	8	2	2	0
Total	216	52	30	21

Dr. Campbell being called for made a few remarks favoring the keeping of the schools open, and further said that he thought this was not the time for discussing the question.

Ald. Forrest said that after listening to the facts and statements made this evening he was more than ever convinced of the necessity of closing the schools for the purpose of arresting the spread of the epidemic. We do not meet here as members of the Board of Health, as members of the Board of Education or other, but as citizens desiring to do our utmost to preserve the health of our children, and as I said before I am firmly convinced that the schools of our city should be temporarily closed. We may talk about the ventilation of our schools. I do not doubt that they are as well ventilated as possible, but we all know that it cannot be as pure as the open air.

Dr. Ross remarked that it seemed to him that the proposition of Mr. Thompson to visit the schools and make a daily examination in regard to the health of the pupils, was one of the best ways to eradicate the disease, but it would be well for the board to take into consideration the expense, and estimated that it would take fifteen physicians to do the work.

The doctor then gave a description of the causes or origin of the disease, and stated that it was the result of an epidemic or atmospheric influence not confined alone to this city, but extending throughout the country, increased and intensified by a lack of sanitary condition. He also gave illustrations of several different cases and stages of the disease, and called the attention of the board to the fact that there was not a properly ventilated school room in the city, and no matter how pure the atmosphere might be in the room in the morning at the commencement of school, at the end of two hours it would become oppressive, which was very detrimental to the health of the pupils. He then stated that there were but two ways to stop the spread of the disease, and that was either by closing the schools or by a personal examination of each scholar every morning by a physician.

Mr. Bartow thought the .best method of stopping the spread of the disease was to isolate the cases, and that, taken in conjunction with the other measures and restrictions passed heretofore by the board, would prevent its spreading; he for one was very loth to close the schools, and would suggest that as there was a number of citizens present, before the board should vote on the question, an expression of all should be taken by a rising vote, which was done, the largest number present being for the continuance of the schools.

Mr. Thompson thought it would be cheaper for the city to employ 15 physicians at $5 per day to make a daily examination of all the children in the schools than to close them for any specified time.

Ald. Porter thought that the board was not in a condition to take action at present, and moved that the board adjourn until Tuesday evening at 7:30 o'clock, and that the clerk be instructed to give public notice inviting all citizens to attend.

Ald. Forrest at this point offered the following resolution:

"WHEREAS, Diphtheria is prevalent to an alarming extent in the city of East Saginaw, and seems to be increasing and spreading;

"AND WHEREAS, It is believed that the said disease is infectious and contagious and that the congregating of children and young people in close rooms, such as school rooms and other similar places, has a direct tendency to advance the spread of such disease; therefore,

"*Resolved by the board of health of the city of East Saginaw*, That all schools in said city, both public and private, evening, day, and Sabbath schools, be closed on and after Monday, Jan. 19th, 1880 and remain closed six weeks or until further orders of this board, the same being necessary as a sanitary measure;

"*Resolved*, That the health officer and assistant health officer and police force of the city be and they are hereby directed to strictly enforce the above resolution."

Laid upon the table until the next meeting, and the board then adjourned.

In reply to the foregoing communication from Mr. Ashley, the following letter was sent, advising the closing of the schools, and replying in detail to the questions proposed by the East Saginaw board of health:

OFFICE OF THE SECRETARY OF THE MICHIGAN
STATE BOARD OF HEALTH,
Lansing, Jan. 19, 1880.

Ferd A. Ashley, Clerk of the Board of Health, East Saginaw, Mich.:

DEAR SIR:—Your communication of Jan. 17 is received, together with newspaper synopsis of the proceedings of your board at a meeting held Jan. 16. In accordance with your request, I reply as follows:

To your first question, *i. e.*, "Whether, upon the showing made, taking in consideration the objections set forth by those opposed, you are of the opinion that it would be advisable, as a sanitary measure, for this board to try the experiment of closing the schools temporarily?" I reply that, after careful examination of all data in my possession, I am of the opinion that it is advisable to close the schools.

To your second question, "To what extent is diphtheria contagious from exhalations in crowded rooms, even if ventilated as well as circumstances will allow?" I believe diphtheria is communicable by the breath and exhalations in crowded rooms, even though ventilated as well as they are now found. I think I have recent experience of this. To just what extent it is thus communicable it is impossible to say. Much depends upon the receptivity of individuals, which may be slight if the person is an adult or has recently had the disease, or even though a child, if it has a perfectly sound throat and lungs; but which receptivity may be great if the person is a child aged three to eight years, and especially if, because of exposure to cold or dry air its throat is alraedy raw or inflamed.

It may be here remarked, however, that the exhalations are not all that should be considered in this connection, because of the many ways in which the poison may get from one throat to another, through using the same cup to drink from; the same pencil which goes into the mouth of the child affected and also of the one who was previously well; by thumbing the same book which has been turned by the thumb of an affected child and previously moistened with his poisoned saliva; not to mention the marbles which so frequently go from the mouth of one child to that of another. In a document issued by the New York city Board of Health in 1873, it is said of diphtheria: "It may be diffused by the exhalations of the sick, by the air surrounding them, or directly by the exudation communicated in the act of kissing, coughing, spitting, sneezing, or by the infected articles used, as towels, napkins, handkerchiefs, etc. The poison clings with great tenacity to certain places, rooms, and houses, where it may occasion cases after a lapse of months."*

To your third question, "To what extent is diphtheria now prevalent in the United States and in this State?" I think the disease is being allowed to spread throughout this State and in many of the United States because of the general ignorance of the people concerning the nature of the disease, and the lamentable lack of proper action by local boards of health, which should lead the people in such knowledge, and should take prompt, thorough, and persistent action for the restriction of the disease.

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* Report New York metropolitan board of health, 1873, page 584.

Permit me again to ask your attention to the document issued by this Board, a copy of which I send, and which, because of lack of means this Board is unable to distribute as freely as it should be distributed, and has therefore asked local boards of health to distribute wherever the disease occurs. This Board has had the document stereotyped to save expense to local boards. I hope your board has been active in its efforts for the restriction of the disease, and if it has not already distributed some such document very freely within its jurisdiction, that it will do so immediately.

In reply to your fourth question, "Do you know of any cities or towns which have closed schools on account of a prevalence of contagious diseases, and, if so, what was the effect in regard to the spread of the contagion?" I herewith send pages from the forthcoming report of this Board for 1879, on one of which —page 111—is an account of closing a village school and the results; only two cases appearing afterwards, except in families which had the disease before the schools were closed. On page 110 is an account of the communication of diphtheria at school by a girl who did not at the time have the disease herself, but whose brother was sick with it at home.

On page 127 is a reference to some action by the board of education in this city, but notwithstanding that action it is proper to state that diphtheria became epidemic in this city in November and December, and that the schools were closed by order of the board of education December 19th, one week before the end of the fall term. Since that time the disease *seems* to have subsided somewhat, though some think the schools were closed too late and that the disease had already spent most of its force, and three deaths from it are known at this office to have occurred already in January, but in families where the disease had prevailed before the close of the schools. There has not been such a report of cases to the local board of health as would show positively what the course of the disease has been in this city. I enclose statements of burials at Mt. Hope Cemetery for the months of September, October, November, and December, 1879.* No report is received of burials at the Catholic cemetery.

Perhaps the most striking evidence on the relation of schools to diphtheria which I am able to send you now is a diagram which I have had copied from the Report of the Massachusetts State Board of Health for 1877, and to which I have made some additions. I have added a line stating by months the absolute humidity of the atmosphere (compiled from data in the original diagram), in order to show as many as possible of the factors supposed to influence the disease. But I think it appears that there was nothing in the meteorological conditions stated which will explain the course of the disease. Seeing that, I wrote to the author, Dr. J. G. Pinkham, of Lynn, Mass., asking about the schools, he replied that "the schools opened Sept. 4, after six weeks' vacation." I think the diagram is very remarkable when taken in connection with

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* [The number of burials in Mt. Hope Cemetery, Lansing, in Sept., Oct., Nov., and Dec,, 1879, and in Jan. and Feb., 1880, and the number of persons there buried who were reported to have died from diphtheria, were as follows:

	1879.				1880.	
	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
Burials	9	8	11	10	10	8
Reported as having died from diphtheria	2	1	3	5	2	1

this statement about the schools; because it shows that when diphtheria was increasing in number of cases, there was a lessening of cases coincident with a vacation in the schools, and a very remarkable rise immediately after the schools opened. As bearing upon this subject, I send you herewith a reprint from our last Report (1878), containing an account of 73 cases of diphtheria, nearly every one of which could be traced to the two families in which the first cases appeared. I have marked a paragraph, on page 85, which speaks of a school-house as being the center of one of the outbreaks of the disease.

I sincerely hope your board will take vigorous and persistent measures for the restriction of the disease in your city.

Very respectfully,
HENRY B. BAKER, *Secretary.*

To this Mr. Ashley replied as follows:

East Saginaw, January 21, 1880.

Henry B. Baker, M. D., Sec'y State Board of Health:

DEAR SIR:—Your prompt favor of 19th instant came duly to hand. Please accept my thanks individually for your kindness.

Our board met again last evening, and after some discussion adopted unanimously a resolution closing all schools until further orders of the board. I enclose you synopsis of proceedings, which although incomplete, will give you a general idea of the scope of the discussion, etc.

Before the close of the meeting I was directed on motion of Alderman Loveland to tender to you the thanks of the board of health of East Saginaw for the very able and prompt reply which you made to the questions sent you by myself as clerk of the board, and for the valuable documents enclosed. This I take great pleasure in doing.

I desire to say in regard to a suggestion of yours, regarding distribution of the pamphlet on Diphtheria, etc., that some time since I wrote to W. S. George & Co., as to price of 5,000 copies in English, but their price was too high; I therefore had printed here 3,000 copies in English and 2,000 copies in German, and had them distributed.

The cost of the 5,000 copies printed as above in two languages was less than one-half the price charged by George for 5,000 in one language.* And it seems to me, as it is desirable that the same should be freely circulated through the State, that your printers should charge but little over the actual cost.

Again thanking you for your kindness in our correspondence, I remain,

Very respectfully, etc.,
FERD A. ASHLEY, *Clerk of Board of Health.*

Enclosed with the foregoing letter from Mr. Ashley was the following report of the proceedings of the East Saginaw board of health, cut from an East Saginaw paper:—

PROCEEDINGS OF THE BOARD OF HEALTH LAST EVENING—A VALUABLE LETTER FROM THE SECRETARY OF THE STATE BOARD OF HEALTH READ—THE BOARD DECIDE TO CLOSE THE SCHOOLS.

The board was called to order and the mayor being absent, Ald. Simoneau was elected chairman. Roll was called: Present, Ald. Barron, Bartow, Blankerts, Fisher, Forrest, Guild, Loveland, Melchers, Osborn, Plumb, Porter, Simoneau, 12. Absent, Cook, Howard, Merrill, Wilson, Mayor, 5.

The minutes of the meeting held January 16, were read and approved.

The following communication from the Secretary of the State Board of Health was submitted and read. [The communication is printed on pages lxvi-lxviii, and therefore omitted here.—H. B. B., Sec.]

The following report from the city attorney was submitted and read:—

" *To the Honorable the Board of Health of the City of East Saginaw, Mich.:*

"GENTLEMEN:—You having asked of me whether it is competent for your honorable body to cause the schools of this city to be closed at any time you may deem it necessary as a sanitary measure, I answer that, in my opinion, it is competent for your honorable body to cause any and all schools, including public as well as private and Sabbath-schools, to be closed and remain closed until such time as it may seem to you that the public health and well-being of our citizens will not be endangered by allowing the several schools to hold sessions; and in this connection I desire to call your attention to title 10 of the charter of the city where, after mentioning in detail many things which may be done by the board of health, this clause is added: 'And from time to time *do all acts, make all regulations, and pass all ordinances*, which they shall *deem necessary or expedient* for the preservation of health and suppression of disease in the city, and to carry into effect and execute the powers hereby granted.' These provisions of our fundamental law are based upon sound principles of public policy and self-preservation. They are very broad, and the public health is confided under these laws to your honorable body. It has been asked whether the provisions of the charter above referred to do not conflict with the act of the legislature incorporating the board of education. I answer that I think not, but if there is any conflict the act incorporating such board of education must give way to the provisions of the charter of the city in this respect, for the public health is in no way intrusted to the board of education, but as I have said, is upon substantial grounds, solely intrusted to the board of health by the charter, upon which the powers of both boards largely depend, for if the charter of the city should be repealed each board would find it extremely difficult to carry out the special trusts imposed by present existing laws.

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*[Considering the paper, type, and impression there is a large difference in favor of the copies supplied by Messrs. George & Co., so that it may be questioned whether the 5,000 copies at their price would not have been the better investment. It is best to have such documents well printed so that they may easily be read.—H. B. B., SEC. STATE BOARD OF HEALTH.]

"The board of health has almost unlimited power conferred upon it in matters relating to public health, and in matters properly cognizable by it, all persons, associations, corporations and boards must yield to its judgment, orders, regulations, and ordinances relating thereto.

"Very respectfully, etc.,
L. C. HOLDEN,
"*City Attorney.*"

The following report from the special committee was read:

"*To the Board of Health, City of East Saginaw:*

"GENTLEMEN:—Your committee, appointed to confer with the board of police commissioners as to the duty of the marshal and the right of the board of health to require certain duties of him, beg leave to report that they met and conferred with the board of police commissioners upon the subject. Said board assured your committee of their wish to do at all times all that they could to aid the board of health in looking after and caring for the sanitary condition of the city and the health of its citizens, and in support of the assertion they called the attention of your committee to the following resolution, passed by them at an early date after their organization this year, and re-adopted Jan. 14th, 1880:

"'*Resolved*, That it is the sense of this board that it is the imperative duty of the marshal, as an officer of the board of health, to obey all orders emanating from said board of health without further orders from this board of police commissioners.'

"It will be seen, therefore, that the board of police commissioners are acting in harmony with this board. The marshal being the assistant health officer of the city, the board may require him to enforce its orders. Respectfully submitted,

"W. J. BARTOW,
"WM. J. LOVELAND,
Committee."

"*January 20, 1880.*

The resolution offered by Ald. Forrest at the last meeting was read, and so changed as to read that the schools be closed Thursday, January 22d, until further orders of the board. Ald. Melchers then moved its adoption. * * * * * * * * * * * * *

Prof. Jones, upon being called upon, said that from the present condition of the schools he thought that it would be a wise plan to try the experiment of closing them and see if the disease would abate.

Mr. Goodman thought that there were two questions to be considered in this resolution:

1st. Does not diphtheria prevail to an alarming extent in our city?

This could be answered by one simple word, and that was "Yes," which is sadly but surely demonstrated to us daily.

2d. Will the means spoken of in the resolution in a measure eradicate the disease?

The gentleman then went on to make a few remarks in favor of it, although he admitted it was an experiment, but thought every thing an experiment, and it should be tried. * * *

Ald. Melchers stated that he had visited six schools during the day and found one-third of the scholars absent, which demonstrated that a large number of the citizens were in favor of closing the schools. He had also seen a number of heads of families, and that they were only waiting the action of this board before removing their children.

The report of the city health officer from January 16 to 20 was read, showing that seventeen new cases had been reported, and of them three had died.

Ald. Porter wanted to know if the schools in South Saginaw should not be excluded from that resolution.

Prof. Jones was called upon and said in his opinion it was best to close them.

The resolution of Ald. Forrest was then carried by the following vote:

Ayes—Ald. Barron, Bartow, Blankerts, Fisher, Forrest, Guild, Loveland, Melchers, Osborn, Plumb, Porter, and Simoneau, 12; nays, none.

Ald. Melchers offered the following resolution:

"*Resolved*, That the health officer shall furnish to the assistant health officer a daily report of all dwellings where any one is suffering from diphtheria, and that the assistant health officer be instructed to cause at once a card with the word 'DIPHTHERIA' in large letters printed thereon to be posted in a conspicious place on said building, and that he notify the occupants of said building to permit no person aside from their family, medical attendants and nurses to enter said house, while said disease exists, and then only after the rooms in the building have been thoroughly disinfected. And if in any case said instructions are disregarded by the person or persons so notified, then the Marshal is hereby requested to detail a police officer to see that said instructions are carried out; and further

"*Resolved*, That the secretary of the board be instructed to cause a copy of this resolution to be published in one issue of each of the papers published in this city, to furnish to the assistant health office a sufficient number of cards above mentioned." Adopted by the following vote:

Yeas—Ald. Barron, Bartow, Blankerts, Fisher, Forrest, Guild, Loveland, Melchers, Plumb, Porter and Simoneau—11.

Nays—Ald. Osborn—1.

By Ald. Melchers:

"*Resolved*, That when a case of diphtheria is hereafter reported to the health officer it shall be his duty to visit the residence at once and cause a thorough cleaning up of such premises if found necessary." Adopted.

By Ald. Guild:

"*Resolved*, That the parents and heads of families are hereby requested to keep their children at home and prevent their congregating upon the public streets as much as possible during the time in which the schools are closed." Adopted by 11 ayes and 1 nay.

Ald. Forrest moved that the assistant health officer take immediate action to abate the nuisance caused by depositing night soil in the vicinity of the St. Clair railroad in the sixth ward. Adopted.

Upon motion the clerk of the board was instructed to express the thanks of the board to Henry B. Baker, secretary of the State board of health, for the very able document submitted and read this evening.

The board then adjourned until Monday evening next, after the meeting of the council.

During the foregoing correspondence the following letter was received from Benj. B. Ross, M. D., of East Saginaw. It contains an important estimate of the number of cases:

Enclosed I send you some extracts from report of meeting of our board of health regarding closing of schools in this city. From some reports of health officer you will see that we have had a good deal of diphtheria. These reports do not cover more than one-half the cases occurring in this city. It is my opinion that during the last year not less than 1,500 cases have existed here. I have myself treated nearly 300. I take the position that the schools should be closed, which will tend to diminish the number of cases. I do not claim that that measure will wholly eradicate the disease, but as I said, diminish it. The board meets again on next Tuesday evening for further discussion.

Can you send me any facts, figures or documents to sustain my position? If not, will you give me your opinion on it. Yours etc.,

East Saginaw, Mich., Jan. 17, 1880. BENJAMIN B. ROSS.

February 6, 1880, the following letter was addressed to the superintendent of the public schools of East Saginaw, to learn with regard to the effect of closing the schools on the restriction of the diphtheria, and generally with regard to the prevalence and causation of the disease:—

OFFICE OF THE SECRETARY OF THE
MICHIGAN STATE BOARD OF HEALTH,
LANSING, *February 6, 1880.*

Prof. Joseph C. Jones, Supt. of Schools, East Saginaw:

DEAR SIR:—I have noticed your table of cases of diphtheria in the East Saginaw paper. In case of desiring it for publication could you add any particulars to it that would increase its value? Any suggestions relative to the effect of closing the schools, upon the number of cases? Any remarks upon the contagiousness of the disease, or the relation, if any, between filth and unsanitary conditions? I shall be pleased to receive your printed report of the schools for 1879, together with any facts which may bear upon the subject. I enclose a stamped envelope for your reply. I would like to know the average attendance at schools by months. Will you give the number of school-children in your city? Very respectfully,

HENRY B. BAKER,
Secretary.

The reply by Prof. Jones is as follows:

DEAR SIR:—In reply to yours of the 6th, I may say: The disease was quite prevalent during June, July, and August, perhaps as much so as any month since, in certain portions of our city; so prevalent that our board of education seriously considered the matter of putting off the opening of schools one month. Great care was exercised by the teachers respecting ventilation and the exclusion of all pupils from families sick with the disease, or pupils with any throat-affection, until some physician would certify that no harm would arise from their return. It is very doubtful if any child ever took the disease in school.

If you will refer to the table mentioned in your letter you will see that the largest number of cases of school children sick with the disease were in the Germania, Emerson, Jones, Houghton, and Potter. These districts cannot be said to be supplied with any drainage, for the open ditches of the streets are poor apologies, owing to the almost dead level of this territory. The disease first broke out in the Emerson and Potter districts, in either of which districts no drainage exists, and there continued the longest. It went to the Houghton and Jones districts next, and lastly in the

Germania, midway betwen the Emerson and Potter—really drawing pupils from all the other four districts.

The nationality of the people sending to the Jones, Germania, and Houghton, is German and Bohemian; of the Potter, largely Irish; of the Emerson, Irish and Americans—the majority Irish. The people are of the laboring and less plentifully supplied class in these districts. In the Central, Hoyt, and Crary districts very good underground drainage prevails. These schools, however, receive pupils from sections poorly supplied with sewers. The pupils in the Bellevue school, one room, are from very poor families, and of the first and second year in school. While no system of sewerage is found in the Sweet and Salina districts, yet a natural one exists there, running through this territory, a wide open bayou bed, besides being in the upper portion of the city.

Very few pupils of the first year of school have been taken with the disease,—pupils enter our schools at six. The greatest number were found in the second, *third*, and *fourth* years,—ages from eight to eleven. The disease has spread in our city by reason of the carelessness of parents visiting and permitting their children to visit families sick with this disease. Until our board of health posted each house infected, this custom went on unchecked. I cannot say what effect closing schools has had upon the disease, for my means of knowing, through the pupils, is gone. I therefore cannot answer this question. The statistics of the city health officer, Dr. Titus Duncan, may give some light, but these are of little value, so imperfectly are the cases reported. It is hoped the experiment may prove of benefit. As respects the actual contagiousness of the disease, but little can be said more than above may be inferred from our experience here, for it has broken out in places, to be sure in sections poorly drained, where there is no knowledge that children with it or people having visited it, have come in contact with those sick. It would seem to be in the air. I am myself watching and studying the disease here, and shall give you any further notes of interest that may appear. We have a school census of 5,327; we enroll about 3,300; 400 more are found in private schools. The enrollment and attendance for the first four months of this school year are:

	Sept.	Oct.	Nov.	Dec.
Enrollment	2,541	2,626	2,666	2,699
Attendance	2,343	2,366	2,335	2,293

The enrollment and attendance for Jan'y were much increased for the first two weeks until the thought of closing schools took possession of our pupils and parents.

If there are any other questions you wish answered, I shall be most happy to comply.

Respectfully, J. C. JONES.

East Saginaw, Mich., Feb. 10, 1880.

Another inquiry addressed to Prof. Jones was as follows:—

DEAR SIR:—Please accept thanks for your favor of Feb. 10, relative to diphtheria in East Saginaw, and in which you say that in some parts of the city it was as prevalent during June, July, and August as in any month since. I would be glad to know the dates of the opening and closing of school terms during 1879 and 1880, and whether the schools were closed at any other time during the year 1879 or 1880. Very respectfully,

Lansing, Feb. 14, 1880. HENRY B. BAKER, *Secretary.*

To this Prof. Jones replied as follows:—

DEAR SIR:—The school year for 1879 closed the last Friday in June, for the long vacation. The fall term opened Monday, Sept. 1, and closed Dec. 24. The winter term opened January 5, 1880, and was closed by board of health January 22. No other vacations occurred. I enclose a communication put in our Sunday city papers of the health officer. It will be seen from his table that the disease was at its highest during the two weeks of the winter vacation. Eight cases were reported February 16, for the previous week. By reference to the table I see this last statement is of no value, for his figures are changed from his weekly reports to the board of health.

East Saginaw, Feb. 17, 1880. Respectfully, J. C. JONES.

The following is the report of the health officer, mentioned by Prof. Jones in the preceding communication, and enclosed therewith. It is a clipping from an East Saginaw paper:—

REPORT OF THE CITY HEALTH OFFICER UPON THE NUMBER OF CASES, ETC., AS REQUESTED AT THE LAST MEETING OF THE BOARD OF HEALTH.

EDITOR OF THE HERALD:—In compliance with directions from the board of health of this city for the health officer to compile a report showing: "1st, how many cases of diphtheria have occurred each week for the last two months; 2d, how many deaths; 3d, how many cases in families where the disease had before prevailed; 4th, a comparison of the number of cases before and after the close of the schools," and furnish the same to the daily papers of this city for publication, I herewith submit the information called for, and respectfully request that it be given a place in your journal.

The following table shows the number of cases reported each week, commencing December 16, 1879, and ending this day, viz.:

1879—Dec. 16 to 23, number of new cases	16
" " 24 to 31, " " "	20
1880—Jan. 1 to 7, " " "	29
" " 8 to 15, " " "	27
" " 16 to 23, " " "	24
" " 24 to 31, " " "	21
" —Feb. 1 to 7, " " "	10
" " 8 to 14, " " "	10
Total cases in the eight weeks	157

During the eight weeks which the foregoing report covers there were eighteen cases of death, making the ratio of deaths to the total number of cases 11⅓ per cent.

As to the number of cases in families where the disease had before prevailed, I am unable to furnish anything like an accurate statement, from the fact that, as the cases are reported to me, that specific information is not given. However, since the closing of the schools, I have made personal inquiries in reference to this fact, and have ascertained that many of the cases have occurred in families where the disease had previously existed, and of the new cases now occurring, fully 33 per cent are from such families.

The matter of comparison of the number of cases before and after the closing of the schools is easy of accomplishment by a simple reference to the tabular statement above given.

The schools closed on January 22d. During the three weeks immediately preceding their closing, the number of cases amounted to eighty; the three weeks which have since elapsed, forty-one cases only have been reported; a decrease of almost one-half. It would be but fair, however, to reckon the first week after closing as affected by the influence under which the children were while in school. In that view the decrease is much more than fifty per cent since the schools have been closed.

The foregoing facts may be said to furnish their own interpretation. Whether the measures taken by the public authorities in closing the schools, and as far as possible segregating the children of the city, have caused the marked decrease in the disease that has occurred, or whether it is a mere coincidence, it would be perhaps beyond the knowledge of any one, with certainty, to affirm. Upon the theory that the disease is contagious—a theory which has been largely confirmed by the facts observed in its character as it has developed itself here—it can hardly be doubted that taking the children from crowded school-rooms has had—and of necessity must have had—a beneficial effect.

In any event it is most gratifying to know that the disease is decreasing, and that, as I learn, both by personal observation and from reports from my professional brethren, it is becoming somewhat milder in type.

For the last six days only five new cases have been reported, and but one death.

If these favorable conditions continue, it will be only a short time before the schools may again be opened with safety to the children as well as to the general public health.

East Saginaw, Feb. 14, 1880. TITUS DUNCAN, *Health Officer*,

February 4, 1880, Chas. A. Bugbee, of Edwardsburg, Cass Co., clerk of the Board of Health of Ontwa township, wrote:—

There have been reported since Jan. 29, 1880, five cases of diphtheria, four in one family, all of which are under control, and are in the country, and the board of health have taken measures to prevent its becoming contagious. Should it, however, become epidemic, I will communicate with you in regard to it.

FATAL CASES OF DIPHTHERIA(?) IN BOON TOWNSHIP, WEXFORD CO.,—REPORTED BY AN EX-HEALTH OFFICER.

We have just had an outbreak of a disease, called by some mumps with sore throat, and by others diphtheria. There were four deaths of small children in two families, out of ten attacks.

Cadillac, Wexford Co., June 18, 1880. H. McNITT.

March 15, 1880, Dr. Jabez Perkins, health officer of Owosso, wrote:—

"In December last we had one case of diphtheria. The patient, a child some five years old, had been on a visit to Grand Rapids for several weeks, and while there was attacked with diphtheria, and on the seventh day of the disease was brought home, where it died three days later."

June 30, 1880, Herman Keiley, clerk of Metamora township, Lapeer county, reported 11 cases of diphtheria taken sick from Jan. 3 to Jan. 28, 1880, the first of which, a boy aged 16 years, died in three days; the others, ranging in age from one and one-half years to 23 years, recovered. The reported source of contagion or infection for the first case was "sorting apples in a damp cellar," for the others "contagion." The first case was taken sick Jan. 3; the next three, Jan. 4.

July 21, 1880, Dr. E. S. Richardson, of Reed City, Mich., reported two cases of diphtheria, as follows:

> "First case began about 15th inst., died 21st inst.; boy, aged 7 years; origin of disease unknown; resided in Big Rapids until 3 weeks ago, when removed to Reed City. The second case is the mother of the boy, taken sick 20th inst. There are two more children in the family, but they show no signs of disease yet."

June 8, 1880, Joseph Marshall, M. D., health officer of Gaines township, Genesee county, verbally reported 15 cases of diphtheria and two deaths from diphtheria in the village of Gaines, an incorporated village of about 400 inhabitants, which had no health officer for that year. One of the decedents was a man aged 30 years; he had membrane in the trachea, removed down to bifurcation. The doctors were not agreed as to the name of the disease.

DIPHTHERIA SPREAD BY INFECTED CLOTHING.

In his annual report for 1879, Dr. A. S. Martin, health officer of Texas township, Kalamazoo county, reported eight cases of diphtheria in that township, the first case being taken sick January 19, the last April 13 (recovered May 4), 1879. Three of them have the surname "Crandall," five the surname "Martin." Their ages ranged from 2 years to 33 years; average age, 12.9 years. Three died, five recovered. The contagium for the first three cases was brought home in the clothing of the mother, who had been attending on a child sick with diphtheria in an adjoining town. Cases 4 to 8 were infected from visits of the same woman.

FEVER COMPLICATED WITH SEVERE INFLAMMATION OF THE THROAT, AT ALBION, CALHOUN CO., REPORTED BY DR. CROSBY.

Within the last ten or twelve days there have been many cases of fever, seeming like common malarious fever, which have been complicated with quite severe inflammation of the throat. In quite a number of instances, several members of a household, sometimes all the members, four or five in number, have been simultaneously attacked with the disease.

The disease has usually yielded readily to such treatment as is given in malarious cases, (with mild topical treatment), terminating its course in a few days. None of the cases have been of such severity, I think, as to excite alarm.

We have not been able to assign any local cause for the disease.

Very respectfully yours,

Albion, Calhoun Co., Mich., June 18, 1881. AMOS CROSBY.

In reply to an inquiry, Dr. Crosby replied as follows:

There was nothing in the appearance of the inflammation in the cases referred to, that suggested to me the idea of diphtheria. There was simply quite intense redness of the throat, with more or less swelling in some of the cases, but not a particle of diphtheritic membrane in any of the cases seen by me, nor in any others that have come to my knowledge. The disease made its appearance very suddenly and disappeared as suddenly. It did not appear to be in the least degree contagious. Usually all the cases sick in a family were attacked about the same time.

Albion, Mich., June 23, 1880. Yours, A. CROSBY.

SCARLET FEVER.

Partly as a result of information conveyed by the State Board of Health by means of the Document on the Restriction and Prevention of Scarlet Fever and in other ways, there is a more general belief in the contagiousness of scarlet fever, and measures to prevent the introduction or restrict the spread of the disease are now more generally and promptly adopted than formerly.

It is believed that the scarlet fever line in the diagrams relating to sickness and to deaths does not run so high as analogy with previous periods of increase or decrease would lead us to expect had no such preventive measures been adopted. There is yet need, however, for much work by the State and by local boards of health in teaching people how to avoid and to exterminate this disease, and by local boards of health in enforcing the law with regard to notices of cases of scarlet fever, and in other measures for the suppression of outbreaks of the disease. A pack of ravenous wolves in the State would soon be exterminated, because people would believe that the wolves *could* be exterminated and would turn out to "hunt them down" until the last one should either be killed or be driven from the State. But the poison of a disease that destroys children, not lambs, is with very little resistance allowed to spread from one city to another, and people simply think themselves fortunate if they *escape* its ravages, or submissively mourn their dead if their loved ones fall—when twenty pounds of sulphur and five pounds of copperas judiciously used would have destroyed the disease in its first haunts.

The State Board of Health document on the Restriction and Prevention of Scarlet Fever is in process of revision with a view to the publication of a larger edition than the first.

Scarlet fever seems to be least prevalent in the warmest months of the year, when there is least irritation of the air-passages by ozone and by cold, dry air. In note "Line Number 64" for February, 1879, page 434, Dr. Batwell says of scarlet fever at Ypsilanti at that time: "As the temperature lowers the disease notably increases; a few fine days and no new cases seem to develop themselves." In diagram 2, page 456, is graphically represented by months what per cent of all the weekly reports of diseases received for 1879 stated presence of scarlet fever.

Although there seems to be close relation of meteorological conditions with the prevalence of contagious diseases, like scarlet fever and diphtheria, yet there is now no known cause capable of producing any one of these diseases except there be present the specific contagium of the disease; and this makes it the more important that *at all times* there should be secured a rigid isolation of persons sick with scarlet fever or diphtheria, and a thorough disinfection of whatever by contact with or nearness to them may have become infected with the contagium of the disease. Concerning the difficulty of restricting and preventing scarlet fever by isolation of the sick, mentioned by Dr. Batwell on page 219 of the Report for 1879, and the cases "not propagated by contagion" reported by him in foot-note *y* on page 459 of that Report, and the cases where "contagion was impossible," reported in note 59 at the bottom of page 401 of this Report, it must be evident that it is very much more difficult to restrict scarlet fever than it is to restrict small-pox; because it is easy by vaccination to render all or nearly all liable to come in contact with small-pox non-susceptible to the disease, while in scarlet-fever though adults do not contract scarlet fever readily, and usually have the disease in a mild form, if at all, no such prevention as vaccination is yet known; it is, therefore, necessary to depend *wholly* on the rigidity, thoroughness, and completeness of the isolation. Under present manifold ways in which articles of daily necessity may come in contact with articles which have come from houses where scarlet fever has occurred, it is exceeding difficult to devise and successfully carry out plans for the most effective and complete isolation, or in all cases even to trace the spread of the disease; but on the success of such measures the control of the disease evidently depends.

SCARLET FEVER CONTAGIUM CARRIED BY A LETTER.

In his annual report for 1879, C. L. Howard, clerk of the Board of Health of Campbell township, Ionia county, stated that scarlet fever was introduced into that township by a letter; and in reply to an inquiry for particulars he wrote as follows:

"The patient's father said that his daughter, who had the scarlet fever, had received a letter from a relative who was or had been sick with the same disease. He thought it must have originated from that, as she had not been exposed in this neighborhood (as there were no cases at that time in town), nor had she been away from home."

Special reports of outbreaks of scarlet fever follow herewith:

SCARLET FEVER AT SALINE, MICH.—DUTY OF THE HEALTH OFFICER.

A mild epidemic of scarlatina has occurred in one school-district in this township. The first case occurred some time ago, and I am informed that it was not isolated. There has been summer school in the district, and the disease has pretty generally spread over the district, and has never been reported to me as health officer of the township. My first intimation of the epidemic existing was when the disease occurred in the family of one of my patrons.

Will you please inform me of my duty in the matter? I have recorded the cases coming under my own supervision. I see that the law makes it the duty of the supervisors of townships and health officers of villages and cities to lodge information with the prosecuting attorney in such cases. It appears to me that as health officer of the township I have nothing to do but record and notice such cases as are *reported* to me, but as I wish to discharge my whole duty in this matter I write for your opinion.

Respectfully,

Saline, Washtenaw Co., Mich., Aug. 30, 1880.

D. P. McLACHLAN,

Health Officer of Saline Township.

The duties of health officers and of other officers with regard to violations of the law requiring householders and physicians to notify the board of health of cases of diseases dangerous to the public health (sections 1734 and 1735, compiled laws of 1871) are fully set forth in Circulars 34 and 35, pages 261–278 of the Report for 1879, copies of which were, with a letter, sent to Dr. McLachlan. It is the duty of the supervisor to prosecute in his own name for violations of this law; the health officer and all other township officers should notify the supervisor of all cases of violation of this law coming within their knowledge; health officers of cities and villages should notify the prosecuting attorney of violations in cities and villages; prosecuting attorneys must prosecute for violations reported to them, and must aid the supervisor, when called on, in prosecutions undertaken by the supervisor.

The health officer should also act promptly for the restriction of diseases dangerous to the public health, in whatever way cases of such diseases may come to his knowledge; and should record both the cases reported to him and those coming under his own observation.

In February, 1880, Jas. N. Collister, clerk of Hope township, Barry county, wrote:

"In January the scarlet fever prevailed in this township to some extent. I have heard of four cases, two of them fatal in one family. None has been reported to this office, however. As far as I can learn at present the disease is checked. I hear of no new cases at this writing."

March 17, 1880, A. V. Phister, clerk of the village of Hubbardston, Ionia county, wrote:

"We have had one death from scarlet fever, boy, 4 years old. Another boy, next family, is also down with it. Was probably brought here from Missouri, a gentleman having a child sick with it there, and who returned from there some two weeks ago."

Jan. 16, 1879, A. D. Salisbury, M. D., health officer of Midland City, Midland Co., reported: "Several cases of scarlet fever in our village, but one death."

Feb. 19, 1879, William Warner, health officer of Summit township, Mason Co., reported four cases of scarlet fever in one family, one fatal; also preventive measures taken. The contagium was supposed to have been brought from town in the clothes of some person other than the first case.

March 17, 1879, C. W. Jones, health officer of Amber township, Mason Co., reported that scarlet fever had raged in that township since Jan. 1, and was then on the increase. There had been five deaths.

May 6, 1879, J. B. Foster, clerk of Holton township, Muskegon Co., reported "a most fatal form of scarlet fever in the adjoining town. All the children in one family (three) died last week. Have suspended their school. A number of new cases are reported to-day."

Jan. 20, 1880, C. T. Andrews, clerk of Roxand township, Eaton Co., reported a death from scarlet fever in that township.

Jan. 19, 1880, George F. Stevens, clerk, and L. D. Knowles, M. D., health officer, of Pine Grove township, Van Buren Co., reported an epidemic of scarlet fever in that township.

March 15, 1880, Jabez Perkins, M. D., health officer of Owosso, wrote:—

"Scarlet fever of somewhat malignant type, is now prevailing in this city. There have occurred as nearly as I can learn, to this date, thirty-one cases, and six deaths. As yet I have been unable to learn anything definite in regard to its introduction. The necessary measures have been taken to prevent its spread, and there have been no new cases reported within the last three days."

June 23, 1880, Dr. A. Moore, health officer of Speaker township, Sanilac Co., wrote:—

"There has been a great deal of typho-malarial fever here this spring, and the township has been literally alive with scarlet fever, so that it would puzzle a Philadelphia lawyer to make a report of them. The physicians are careless and no not report diseases to health officers.

"Yours, &c., A. MOORE."

TYPHOID FEVER.

July 21, 1880, Dr. E. S. Richardson, of Reed City, Mich., reported the "first case of typhoid fever occurring in Reed City, a young man taken to his bed on the 8th inst., died on the 18th." July 27, in reply to questions, Dr. Richardson reported details of this case, and expressed a doubt of its being "typhoid fever." He stated that the water of the well from which the patient had drank remained clear under Heisch's test; also, that his feces were thrown into a "privy-vault which is full and quite liquid, emitting a very offensive odor." The feces and other discharges from typhoid fever patients should always be burned, and should never be buried or thrown near a well or water-course, or into a privy-vault. Dr. Richardson also stated that nearly two years before he had had a case presenting symptoms strongly resembling typhoid fever.

April 12, 1880, Dr. W. W. Mulliken, of Escanaba, Mich., wrote that "Disease is on the increase; typhoid diseases in particular have shown a steady increase for the last five years, and fully ten per cent this year over that of last." He also wrote as follows concerning the water-supply:—

"The village of Escanaba is situated on a peninsula of sand, projecting into Green Bay, and all the water supplied to the town by wells, the larger majority of them simply holes dug down to the level of the bay and curbed to prevent the caving in of the sand, so of course all the water is surface-water, charged with the poisons that have washed from uncleaned barn-yards, pig-pens, privy-vaults, slops from kitchens, etc.

"For fifteen years the most of these agents have been in active operation, with little or no cleaning. Privy-vaults have been filled, and then buried loosely in sand, and new ones dug. Refuse from stables has lain in piles and rotted down, until at last the drinking-water has become so affected that it is not fit to drink."

SMALL-POX.

February 7, 1880, Dr. M. Veenboer, health physician of Grand Rapids, reported cases of small-pox, as follows:

"We had one case of small-pox, on the 13th of January last named, H. T. F., coming from Burlington, Iowa, who had probably contracted the disease about two to three weeks before at Chicago. He died on the 16th of January, with the hemorrhagic form.

"Mrs. H. T. F., of this place, who attended her husband, was taken with the varioloid on the 20th of January, and has recovered.

"Mr. George B., who was in the same sleeper from Chicago with the late H. T. F., was taken sick with the same disease on the 30th of January. Was reported to the board of health on the 2d of February, when he was removed from the hotel to our hospital or pest-house, and died on the 3d at 10 P. M., with the same hemorrhagic form of the disease as did H. T. F. No more cases reported."

April 29, 1880, Dr. D. E. Newcomb, health officer of Ash township, Monroe county, Mich., reported two cases of small-pox, as follows:

"There are two cases of small-pox in the town adjoining, and they have exposed about thirty persons. I would like to have you send me, or inform me where I can get, some pure bovine virus."

This board does not keep or supply vaccine virus. Reliable bovine vaccine virus may be obtained of Dr. Geo. E. Ranney, Lansing, Mich.

March 2, 1880, Dr. Edward Batwell, health officer of Ypsilanti, Mich., reported a case of small-pox (the origin of which he could not trace), as follows:

"A young girl, living in the family of one of our leading citizens, was attacked with all the symptoms of continued fever. On the second day a rash made its appearance on the forehead, which, presenting that *shot-like feel* so peculiar and so characteristic of variola, was watched by me very closely and with much interest. On the fourth day I had a well-developed case of small-pox on hand. The question now is, where did it come from? The girl had not been at the paper-mills or in company with any one who worked there, or out of the house for two weeks before; then she had gone to a dance in the country. There has not been a case of small-pox in this city for three years, nor in the country where she went to this dance has one *ever been heard of*. Her residence and surroundings were of the very nicest sort and the family remarkable for their *hygienic proclivities*. She had never been exposed to contagion of small-pox, nor had she been vaccinated. Now, where did it come from? Not from contagion or infection, as far as mortal can tell."

March 5, 1880, in reply to questions concerning the origin of this disease, Dr. Batwell wrote as follows:

"This small-pox patient has not had a letter in six months, from any point. The gentleman in whose employment she is never brings his letters from his store, nor has the lady of the house had a letter from outside this State, and then from no locality where variola exists. The gentleman has had no communication of any sort from Montreal, or Washington, or Grand Rapids, nor does he ever put a letter in his pocket. I am a firm contagionist, but this case shakes my faith, though I have tried faithfully to trace its origin. The patient has it very severely, though I think she will recover. The proprietor of one of our paper-mills spent an hour at the house some twelve days before, but he never saw the girl, and had not on the clothes * he wears at the paper-mill; nor is he in the rag-room more than a moment at a time, and very seldom is there at all."

March 16, 1880, Dr. Batwell sent a circular of the Binghampton, N. Y., Oil Refining Company relative to petrolina and petrolina oil, products of petroleum, concerning the use of which in the before-mentioned case of small-pox he wrote as follows:

"The effect of this petrolina as a local application to variola has been perfectly extraordinary in the case of small-pox we had here. I had experienced its effects as an emollient in other diseases, and applied it in this. It allayed the itching and dried down the pustules, leaving a smooth surface, *without a pit*. The case was a very severe one, and promised to leave permanent disfigurement, but I am glad to say such is not the fact. I am not ambitious enough to desire another chance of testing the effects of this oil, and write to you to let some of our less fortunate professional friends know and test its virtues. It is very cheap, only $1.25 a gallon, and certainly ought to be tried.

"I am very glad to say no further spread of this disease seems likely to occur here."

[* He probably had on the same hair?—H. B. B., Sec. S. B. of H.]

January 24, 1881, Dr. Batwell wrote as follows concerning another case of small-pox:

"A case of small-pox has broken out in a babe, 3 months old. Last year it was in the same house, but it had been thoroughly renovated, painted, papered, and calcimined throughout. The family have lived there ever since, with their children. Now, of course, there was no possible means of contagion except from this cause, so I ascribe it to it. Every precaution to prevent its spreading has been taken. The case of last year was one of the mildest varioloid. The present is one of severe variola."

DISINTERMENT AND REMOVAL OF REMAINS OF PERSONS WHO DIED FROM DISEASES DANGEROUS TO THE PUBLIC HEALTH.

By the courtesy of Dr. Wellings, health officer of Lansing, the following inesting report has been received, of the method of disinterment and reburial, without communication of the disease, of a man who died of small-pox. The burial and reburial took place at Lansing:

Dr. J. H. Wellings, Lansing, Mich.,

DEAR SIR:—Referring to your request for particulars of death and removal of remains of my father, I will state, that he died of small-pox in April, 1872, and was interred in a metalic case in the old cemetery. February 3, 1880, I employed G. Straub to remove his remains to Mt. Hope Cemetery, and instructed him to pursue the course you had previously suggested, to-wit, to have the labor performed by some one who had recovered from the disease, or had been recently vaccinated, then to excavate down to the coffin, and then place there a pan filled with live coals upon which to pour one pound of sulphur; then to cover the grave closely and allow it to remain over night before finally taking out the remains and making removal. I provided Mr. Straub with the materials and specific instructions as to manner of procedure, which he said he would, and afterward said he did, follow. Mr. S. tells me that the coffin was still strong and substantial, and that the ordinary odor of removal was scarcely perceptible in this instance. Very truly yours,

Lansing, Mich., July 20, 1880. H. H. LARNED.

MEASLES.

Feb. 8, 1880, F. G. Bullock, supervisor and health officer of Elba township, Lapeer Co., reported a number of mild cases of measles.

Feb. 18, 1880, Geo. H. Greene, health officer of Burlington township and Burlington village, Calhoun Co., reported 15 cases of measles in the township since Jan. 1, 1880, six not yet recovered, no deaths; and 20 cases of measles in the village since Jan. 1, no deaths, four cases not yet recovered.

March 30, 1880, J. C. Davidson, M. D., health officer of Berlin township, Monroe Co., reported "an epidemic of measles during the months of January and February," which had subsided at the date of the report.

March 25, 1880, Dr. W. Simonds, health officer of Warren township, Macomb Co., reported an epidemic of about 150 mild cases of measles in two or three weeks and asked concerning the advisability of closing the schools.

RESTRICTION OF MEASLES.

The following case of successful restriction of measles to one family is reported by the health officer of Ferry township, Oceana county. It is believed that the general adoption of the same method would prevent much sickness and most of the deaths from this disease.

MEASLES RESTRICTED TO ONE FAMILY.

The cases of measles mentioned in my report were all confined to one family, and by the good sense and judicious management on the part of the parents of the children, the disease was not allowed to spread. No one was allowed to come near the house unless he was known to have had the measles. If all the people were as careful there would be less of such diseases in the country.

Yours respectfully, DANIEL LANDON,

Ferry, Oceana Co., Mich., Feb. 10, 1880. *Health Officer of Ferry Township.*

ERYSIPELAS AND PUERPERAL FEVER.

From four correspondents replies have been received to a letter of inquiry concerning the relations of cases of erysipelas and of puerperal fever of which they had made reports. Replies to this letter previously received are printed on pages 345–350 of the Report of the State Board of Health for 1877, and on pages 131–4 of the Report for 1879. The letter was substantially as follows:—

——————,

DEAR SIR:—In your report of diseases for the week ending Saturday, ————, you mentioned both erysipelas and puerperal fever. So much has been written concerning the relation of these two diseases that we desire to obtain and place on record facts bearing on the subject, whenever an opportunity occurs. Will you have the kindness to write me concerning these cases? After you have investigated the subject, I should be glad to have a report of the facts tending to *prove* or *disprove* any connection or relation between the two diseases.

REPLIES BY ROBERT HENDERSON, M. D., OF DAYTON, MICH.

I have had three opportunities to note the effect of erysipelas on parturient women. *1st case.* Mrs. A. J. D———, abortion, third month. She began with violent fever, no doubt bilious remittent, then flowing began, which ended in abortion. The discharge had been going on two days before erysipelas set in, abortion occurring the day after. The erysipelas was quite severe, and mostly upon the face, invading, however, the conjunctival membrane, also mucous of mouth and tongue. There was no puerperal fever, however. Could not see that it made the case of abortion any more severe. *2d case.* Mrs. N. B.; delivered her October 21, 1879. She commenced flowing terribly on the eighth day after delivery. Had to tampon to save life. Kept her in bed for a week. No fever until the 16th day, one day after getting out of bed. She continued to perform her household duties for a week. I did not attend her, after removing the tampon, upon the 9th, until the 22d day, Passing by accidentally I stopped. Saw her condition was such as to preclude the idea of work. Ordered the husband to put her to bed and elevate to bed-posts. This was Thursday. Sunday he came for me. Found her dying, but still sitting up. Had not gone to bed as I ordered, and had not sent for me nor any one else. Peri-uterine-cellulitis had set in. Died Tuesday, the 28th day after delivery. Dr. Darling, of Laporte, Indiana, verified my diagnosis on the 27th day at 1 A. M., six hours after I had been called. We concluded that carelessness upon her part when she should have been at rest had caused the condition, and that erysipelas had had no influence, although I had cases of it all the time. *3d case.* Mrs. Wm. B.; delivered her December 15. Puerperal fever set in on the 17th, a little over 36 hours from delivery. Temperature averaged 104° for five days; in each of these days about 6 P. M. went up to 105°, never below 103°. * * * * Saw her four times daily. Had a case of erysipelas the day her fever began, but saw the erysipelas after the puerperal fever began, and did not go back to the case of puerperal fever until next day, and then washed in weak solution of carbolic acid water before seeing her, calling on the case of erysipelas always the last thing. Don't believe it had any effect upon this last or any other case. Was careful in each instance to disinfect my hands completely before calling.

In the first case, the abortion, she had and was subject to erysipelas. In the second case, the fatal one, could trace no connection, it being in the country, three miles from any case of erysipelas, and she was not very sick until three weeks were gone, having by carelessness brought on the peri-uterine-cellulitis. The *third case* developed puerperal fever before I saw any case of erysipelas, and recovered after severe illness. Therefore, I cannot believe it had any effect in my cases. Some six other women were delivered at different times along during this time without effect. The erysipelas was mostly of the face, only three out of sixteen cases being traumatic.

Respectfully, ROBERT HENDERSON, M. D.

Dayton, Berrien Co., Mich., Jan. 14, 1880.

REPLIES BY W. H. ROUSE, M. D., OF DETROIT, MICH.

I have seen no case of puerperal fever (those reported are on the authority of others) since I wrote to you on this subject. [See State Board of Health Reports for 1877, page 350; and for 1879, pages 132–3.]

I have attended quite a number of cases of erysipelas, and while attending them have cared for puerperal women without observable trouble from such circumstances. From all facts observed in my own practice there seems to be no connection between these two diseases, though some of the constitutional symptoms may be analagous.

Erysipelas at times seems to be contagious, as shown by the following, reported by my friend Dr. Norton of this city:

"During the winter of 1848-9 a man wounded his thumb, erysipelas set in, extended up the arm, and caused death. On the fifth day his nurse was taken with chills and nausea, followed by erysipelas and death. Twelve others who attended on one or more of these cases were similarly affected with chills, nausea, and erysipelas, the symptoms appearing in most of the cases on the fifth day after exposure. Abscesses formed in only one of these cases, and eleven out of the fourteen recovered, though the symptoms were grave in all. The weather was very cold."

If erysipelas can affect attendants as on this occasion, there can be no reason to doubt that puerperal women would be injuriously affected by exposure to such noxious influences; but whether puerperal fever would result or not might be an open question. There was in the cases reported more than the ordinary severity, for as erysipelas usually appears it seldom extends to nurses or other members of the family unless the hygienic surroundings are exceptionally bad. I have never seen a case of erysipelas transmitted to others by undoubted contagion, and hence I infer that under ordinary circumstances the disease is not *per se* contagious; but that in those cases in which evidence of transmission from one to another seems probable or possible, some other factor is present which is the real cause, but is latent or overlooked by the observer.

Under certain circumstances favorable to the development of the disease, such as may at times be found in hospitals—and possibly did exist in Dr. Norton's cases—this disease seems to be contagious, but it would be difficult to prove whether the diseased person or the surroundings otherwise was the true inciting cause. It is very unusual indeed to see more than one person even in large families where no attempt at isolation has been made, suffering from erysipelas at or about the same time. This should not be the case if the disease were contagious.

439 Sixth St., Detroit, Mich., June 2, 1880. W. H. ROUSE, M. D.

REPLIES BY O. C. WILLIAMS, M. D., OF MUSKEGON, MICH.

The cases of puerperal peritonitis I mentioned in my card, are as follows:—

Case No. 1.—Dr. S., attending physician; female, aged about 35 years; had been confined five days before; no physician in attendance, Dr. S. called May 25; found patient in hard chill,—reaction set in soon after proper remedies were administered; symptoms those of puerperal peritonitis; patient died 9 A. M., May 29th; no tympanitis, but little pain and tenderness; temperature 104½° and 103°. Patient had been attended by a nurse prior to the doctor's attendance, who came direct from nursing an old lady who had erysipelas, and is still sick with the disease.

Case No. 2.—Dr. O. C. W., attending physician; septic peritonitis; American; primipara, aged 18 years. Called May 26, at 8 A. M. After one and one-half hours, or at 9:30 A. M., short and decisive labor, lady was delivered of healthy female child; position, 1st vertex. The lochia were free and and sanguineous up to the 31st, when they became very scanty. This was preceded with a hard chill, which was again repeated June 2. Inflammatory symptoms began on May 29, sharp and shooting pains in the hypogastrium, which was tympanitic and very sensitive. The pulse varied from 98 on the morning of the 5th day to 160 on the 7th; temperature 104½°—104°—104°—103½°. She She died on June 3, at 4 o'clock P. M.

No cases of erysipelas in neighborhood, or among attendants or physician and counsel. I have not attended any cases of erysipelas lately. The other cases were of the same, as nearly as I can find out.

Yours, etc.,

Muskegon, Mich., June 15, 1880. DR. O. C. WILLIAMS.

REPLIES BY JOHN P. STODDARD, M. D., OF MUSKEGON, MICH.

Mrs. H. was confined May 20, 1880, and it was her third or fourth pregnancy. No physician was in attendance; so rapid was the labor there was no time to summon one. She received assistance from a neighboring woman only. An experienced nurse was procured and was at the house in about eight or ten hours after the child was born.

On May 25, at 3 P. M., I was called in haste. Found patient in a profound chill. Soon reaction occurred and the fever ran high. Great tenderness over lower portion of the abdomen, and at once I found I had a very severe case of puerperal peritonitis. There was no second chill, but continued fever. Death occurred May 29, from exhaustion.

In making inquiries in regard to former pregnancies, I was informed that after the preceding confinement (about two years previously) she had a similar attack and barely escaped with her life.

The nurse, I understand, had attended some little time previously a case of erysipelas, of a rather severe type but not fatal.

The cause (immediate) of Mrs. H.'s attack, I consider, was from getting profoundly chilled. The 25th, the date of attack, was a warm day. After dinner she ordered a window-sash near her bed raised, and soon after fell asleep. There was a sudden fall in the general temperature (as often occurs here on this lake shore), and she was awakened by the cold and found herself in a severe chill. I think this exposure to cold to be the sole immediate cause of the disease. I think the predisposing cause to be the influence or tendency left from the former attack of the same disease. I feel quite sure that there is more or less a tendency to a recurrence of puerperal fever, when it has once been severely experienced. On this subject I would refer you to an article by Dr. Eugene P. Bernardy, of Philadelphia, in "The American Journal of Obstetrics," Vol. 13, pp. 581-586 (July No., 1880).

While I most emphatically believe that the contagium of erysipelas may be, and too often is, conveyed by either physician or nurse to the puerperal woman, and is thus a frequent cause of puerperal peritonitis, especially in cities, I do not believe the present case to come under this category. I believe if the nurse had been contaminated she would have been far more likely to have given the disease (or at least as liable) to the child than to the mother, but the child was not in the least contaminated. By sad experience I know how easily erysipelas is conveyed by a contaminated nurse to a child while dressing an unhealed navel, but the limits of this letter prevents any further reference. Yours very truly,

Muskegon, Mich , Dec. 1, 1880. JOHN P. STODDARD, M. D.

REPLIES BY G. B. ALLEN, M. D., OF CHARLOTTE, MICH.

After investigating the matter as well as I have been permitted, I cannot find any direct relation between the two diseases. There were but few cases of each disease at the same time, and I can hardly regard their presence as anything more than a mere coincidence. The cases of puerperal fever were simple, and not attended with the high rate of mortality that the disease generally assumes when it prevails to a general extent. The cases of erysipelas were of quite a severe character, but not more fatal than the usual results, but rate of mortality was greater than that of puerperal fever.

About the time we were having these diseases there were cases of diphtheria, and it would seem that there was more of a relation with that disease and puerperal fever than with erysipelas. In one family I was attending a young man sick with diphtheria. During his illness a brother's wife was delivered of a child at normal period, everything progressing favorably until the third day of her confinement, when puerperal fever supervened. She was attended by another physician. The eighth day she died. Both of these patients occupied the same house. Another case in point was very much the same, only a greater length of time elapsed between diphtheria and the fever. I attended the child sick with diphtheria. About a month the mother of the child was confined, and within four days she was taken sick with fever. She lived, but her recovery was doubtful for many days. The physician who attended these cases told me he had not seen other patients sick with either of these diseases or erysipelas for some time—months.

I know that at this time all my lying-in cases had symptoms of inflammation, and so strongly impressed my mind with the idea of some relation of these diseases, that I refused to attend obstetrical cases while I was treating diphtheria. It is true that I had been treating some of the patients sick with erysipelas before this, but not at that time. I have made it a rule not to attend obstetrical cases when in attendance on erysipelas. I believe that there is a relation to the two diseases in question, but I think to establish such a relation there must be more than a few cases,—or "sporadic" ones. Yours Respectfully, G. B. ALLEN.

Charlotte, Mich., June 23, 1880.

ERYSIPELAS.

The following letter from Dr. Palmer was received in reply to inquiries as to the cause of numerous cases of erysipelas reported by him on the weekly report cards for the two preceding weeks, and as to the communication of the disease from one person to another.

I can find no satisfactory cause. It has not been conveyed from one to another,—have not had more than one case in any one family. In most of the cases the disease has appeared upon the face. Sanitary conditions in all cases have been good. Two of the cases the disease started upon the hands; in one from rubbing them when they were chapped,—the worst case I have had of the phlegmonous variety, and extending to the shoulder. The other from scratching her finger with a piece of stovepipe. In most of the cases the exciting cause was attributed to scratching off a pimple or something from the face. One boy of nine had been having intermittent fever, from which several sores appeared upon the lips; removing one of the scabs started erysipelas almost immediately, which spread all over his face within 48 hours; and the glands of the neck, together with the submaxillary, were swollen almost as badly as in cases of malignant diphtheria. The disease in all cases has been of an asthenic character. If I was to express my opinion in regard to the cause, I should say that from the effect of our open winter, with perhaps local causes as yet undiscovered, the human system in some cases has been brought to a condition by which any little local irritation would develop that type of inflammation.

Very respectfully,

Brooklyn, Jackson Co., Mich., April 22, 1880. E. N. PALMER.

RAGWEED AND HAY-FEVER.

In order to secure a record of facts observed in the State concerning the relation, if any, between the prevalence of hay-fever and the blossoming of the ragweed plant, the following letter was sent in August, 1880, to regular correspondents of the Board. It is immediately followed by the replies received:

OFFICE OF THE STATE BOARD OF HEALTH,
Lansing, Michigan, August 7, 1880.

DEAR DOCTOR:—As it is about time for the blossoming of the common ragweed (*Ambrosia artemisiæfolia*), and as considerable has been written of a possible causal relation between the blossoming of this plant and the prevalence of "hay-fever," "influenza," "summer cold," will you have the kindness to notice whether any such connection seems to occur in your vicinity, and to place on record the facts noted to be hereafter reported to the State Board of Health?

Very respectfully, HENRY B. BAKER.

REPLIES BY R. H. OSBORN, M. D., OF CALUMET, MICH.

Owing to an entire absence of "hay fever" in this section of the State, I think we shall be unable to make any observations that would be of any service.

Calumet, Houghton Co., Mich., Aug. 16, 1880. Truly yours, R. H. OSBORN.

REPLIES BY GEORGE W. ORR, M. D., OF CENTRAL MINE, MICH.

We have had no hay-fever in this locality this season; and I am informed that individuals suffering with the disease get relief immediately after arriving in this locality. The ragweed does not flourish in this section. I have not seen a single plant this season, and am informed it does not grow here. Yours respectfully,

Central Mine, Keweenaw Co., Mich., Oct. 2, 1880. GEO. W. ORR.

REPLIES BY JUDSON BRADLEY, M. D., OF DETROIT, MICH.

I do not believe that there is any connection between the pollen of the plant in question and the so-called "hay-fever," for these reasons:

1. The ragweed is very plenty in Hamtramck and vicinity.
2. There has not any case fallen under my observation this season of "hay-fever."
3. I cultivated, or rather allowed to grow, a crop of it—ragweed—under my kitchen window for the benefit of the servant-girl, and she was heard to sneeze but three or four times during the season.
4. The nervous element in "hay-fever" seems to predominate to such an extent, and is generally so quickly relieved by nitrite of amyl, that I have doubts about the disease being caused by dust or pollen, or any extraneous substances. Yours truly,

1081 Jefferson Av., Detroit, Mich., Oct. 2, 1880. JUDSON BRADLEY.

REPLIES BY A. R. SMART, M. D., OF HUDSON, MICH.

Hay fever has been unusually frequent in this vicinity this season. Its out-break coincided with the blossoming of this plant. There is an increasing amount of the plant from year to year, in this vicinity. The disease had a duration generally of four to six weeks, or until the occurrence of frosty nights,—commencing about the 15th or 20th of August. Whether these facts have any relation to each other, I am unable to say. I have always inclined to the view that hay fever was a masked form of malarial disorder, as it is somewhat under the control of quinia, etc., and occurs, with us at least, at a time when intermittents are most prevalent. I have noted the above mentioned facts this year, and you may draw your own conclusions. I am personally interested in finding the cause and cure of the malady, as I am a sufferer.

Hudson, Lenawee Co., Mich., Oct. 7, 1880. Yours, A. R. SMART.

REPLIES BY W. L. WORCESTER, M. D., OF KALAMAZOO, MICH.

I am unable to throw any light upon this subject. The rag-weed grows abundantly in the neighborhood, but there have certainly been no cases of hay-fever in the male department of this institution since your circular was received, and I have not been able to hear of any in the female department. W. L. WORCESTER.

Michigan Asylum for the Insane, Kalamazoo, Oct. 13, 1880.

REPLIES BY H. W. JONES, M. D., OF HOUGHTON, MICH.

Hay fever is uncommon in this section of the country, though cases occur every summer; and I have particularly noticed that it is during the blossoming of the white clover that it is contracted and more particularly by those whose lawns are full of it.

I have not known of a case of hay fever that can be traced to the blossoming of ragweed, most cases being over by the time that plant is in bloom.

Houghton, Houghton Co., Mich., Nov. 20, 1880. Very respectfully, H. W. JONES, M. D.

The following communication was received from E. J. Bonine, M. D., Niles, Mich.:—

Some ten or twelve years ago, in August, I commenced having what I supposed to be a mere summer cold, from which I suffered several weeks. I soon discovered that it made its appearance every year about the same time, with increased severity. It has followed me up to the present time, and for several years it has made its attack on the 21st day of August, at 1 o'clock. I have witnesses who have watched to see it make the attack, in fact the whole neighborhood would turn an ear on my premises at that precise time to hear the sneezing racket commence. Three years ago I was nearly three hundred miles southeast of this place on the 21st day of August, and at one o'clock P. M., precisely, it jumped on me with greater severity than ever before. I was at an old settlers' re-union, enjoying myself hugely, and had forgotten the hay fever trouble until it caught me with such ferocity that I could not walk from the grounds. I have been in different climates and localities, and it comes on the same day and hour.

Now, what is it? The ragweed theory don't amount to anything. I can wallow in it until I am yellow from its blossoms and it don't change my condition a particle. When I was in the South it was in full bloom three or four weeks before I took the disease. I went into the fields where the weed was as high as my head and in full bloom, purposely to see if it would produce any symptoms of the disease. It did not affect me a particle. When it took me I was in a beautiful grove where everything had been thoroughly wet down with a big rain, and not a ragweed in sight. I find no remedy for it in the shape of medicine.

Once I went to Kansas to hunt buffalo, and when I got out where the grass was all grazed off short, the hay fever left me at once, and did not return that season, as the frost had destroyed all vegetation before I returned home.

Another time I went to Saginaw to attend the State fair, and while in that saline city it did not bother me a particle, nor did I have a vestige of it until I returned home, when it took hold of me again, and lasted until relieved by frosts killing down the vegetation.

If you know of anything better than going to Mackinaw, or with Beecher to the White Mountains, just let me know. Very respectfully, E. J. BONINE.

Niles, Berrien Co., Mich., Aug. 22, 1880.

Dec. 14, 1880, W. W. Mulliken, M. D., of Escanaba, Delta Co.. Mich., wrote:—

I watched faithfully the effects of ragweed on the prevalence of summer colds, and must say that in my whole practice I have not met with over one-half dozen cases originating here, though the weed grows in abundance. Cases originating in Illinois, Wisconsin, and southern Michigan are greatly benefitted by coming here. I gathered a number of the plants and had them in my sleeping apartment, but remained free from any unpleasant symptoms.

March 15, 1881, Edwin Stewart, M. D., of Mendon, Mich., wrote:—

"In regard to hay asthma, some cases appeared before the ragweed was in bloom, and the disorder did not seem to have any relation to the flowering of the plant."

Jan. 12, 1880., Dr. I. E. Randall of West Bay City, wrote, in reply to a letter, similar to the preceeding, sent Sept. 8, 1879, and referring to cases of hay-fever reported by him for the week ending Sept. 6: "I did not succeed in tracing any cases of hay-fever to the *rag-weed.*"

SICKNESS ATTRIBUTED TO THE HURON RIVER RUNNING DRY.

The following postal communication from Dr. Batwell, health officer of Ypsilanti, is of interest in connection with statements heretofore published concerning sickness caused by lowering the water in Huron River. These statements may be found on pages xxxiv.–xxxv. of the Report for 1878, and on page 459 of the Report for 1879.

The influence our river has on the health of the people has been strikingly illustrated this past week. The Huron River has been very high all this summer, and kept full to its highest point. Last Sunday it was shut down at some point up the river; on Monday every one was feeling ill, and on Tuesday and Wednesday every one was enjoying the pleasures of a "shake." Previously to this, no one was sick, *not a single case of illness through this section. This week no one is well.* The river is falling again and getting below its banks.

Ypsilanti, Washtenaw Co., Mich., Aug. 21, 1880. EDWARD BATWELL, M. D.

ARSENICAL POISONING BY COLORED HOSE(?)—REPORTED BY THE HEALTH OFFICER OF BIG RAPIDS, MICH.

I report to you a case of suspected arsenical poisoning, cause, wearing brown-colored woolen hose. Female, age 22; spare habit. Left leg swollen; red and tender on pressure; small pin-head elevation with a watery fluid underneath. This soon dried down and then peeled off. About the heel it produced a raw surface by undermining the cuticle. This erysipelas eruption lasted about two weeks. The other limb was slightly affected with a few red pimples, and with an intense itching which lasted only a few days. By washing the stocking in clear water it colored the water green. Should the above fact be correct, we should be very careful in wearing colored clothing next to the skin.

Big Rapids, Mecosta Co., Mich., March 19, 1880. I. W. BADGER, M. D.

NOTICES OF DISEASES DANGEROUS TO THE PUBLIC HEALTH.

With his annual report for 1879, S. J. Smith, M. D., health officer of Fairgrove township, Tuscola Co., sent the following communication relative to the difficulty of securing from householders and physicians notices of diseases dangerous to the public health. It relates to a subject on which others have written, and in which many are interested.

I reluctantly accepted the appointment as health officer to this board at their annual meeting last year, but consented to do so on condition that such action should be taken and methods pursued as would enable me to make the proper records and report at the close of the year to the secretary of the State Board of Health. The board co-operated with me in such measures as we thought would secure the end in some degree satisfactory to ourselves, and meet the demands of the law and the desire of the State Board.

To this end a large supply of blank notices for the use of physicians and householders was obtained and distributed. The board also, at a special meeting, adopted stringent sanitary rules, and caused them to be made public as possible throughout the township. These labors and rules have been little regarded by physicians and householders of the township. Early, and during the prevalence of diphtheria in this and other towns and villages of the county, the prosecuting attorney for the county issued a proclamation, in which he set forth the law and his duty in relation thereto, and that he should promptly attend prosecutions commenced by supervisors for non-compliance with the law.

So far as I can discover, all these labors and warnings have failed to arouse householders and physicians to a sense of their duty, so far as the jurisdiction of this board extends.

I have cause to believe that more than 200 cases of contagious and epidemic diseases have occurred in this township during the current year; and yet not more than three or four cases have been reported to the board through the proper channels and at the proper time. The cases reported to you herewith were gathered up from various sources, from school-teachers and other parties who have made special inquiry upon the subject. Not being a practicing physician it has been impossible for me to gather, tabulate, and keep a record, as the law requires, or that would enable me to make a proper report.

The great hindering cause to compliance with the law in gathering facts and making reports properly is due, not to faulty acts of the board, but to the utter indifference of physicians and householders to the matter—a failure on their part to comply to the law's requirements. I see no way out of this apathy and shameful neglect till the law shall be enforced.

It is extremely mortifying to return to you the blanks only mutilated, and from which you can gather little or no information. Very respectfully, S. J. SMITH, M. D.,

Fairgrove, Tuscola Co., Mich., April, 1880. *Health Officer of Fairgrove Township.*

If none of the blank notices distributed by the local board of health should be used by householders or physicians in reporting cases of diseases dangerous to the public health, the distribution of the blanks would not therefore be a waste of time and money. It will have called the attention of the people to their duty, both under the State law and under the "golden rule" of doing to others as we would have them do to us. This duty they will think of; various events will call it to mind; the spread of a dangerous disease in their midst from failure of others to give proper notice of the first cases will enforce the importance of such notices; they will blame those who have failed to give the notice required by law, rather than the board of health for not instructing the people in their duty, and in time will adopt the habit of giving the required notice. The distribution of the blanks as a means of calling attention to the law will also prepare the way for prosecutions by the supervisor or the prosecuting attorney for neglect to give the legal notice. Besides, this distribution of the blanks is one of the duties which the board of health should perform because it is the right thing to do, whether people hear or whether they forbear.

In May, 1880, there was sent from this office to the prosecuting attorney of every county in Michigan a copy, reprinted from the *Lansing Republican*, of the following communication to that paper by the prosecuting attorney of Ingham county calling attention of physicians to their duty under the law to report to the health officer or to the local board of health all cases of diseases dangerous to the public health which they are called to treat. With this communication were sent Circulars 34 and 35 and the document on the Restriction and Prevention of Diphtheria.

PHYSICIANS, OBEY THE LAW.

To the Editor of the Republican:

I desire to call the attention of all physicians in this county to section 1735, Vol. 1, compiled laws of this State, which makes it the duty of all physicians to report to the health officers of their localities all cases of contagious diseases which they are called upon to treat. The prevalence of diphtheria and scarlet fever in different localities requires that all the regulations calculated to prevent the spread of diseases should be rigidly enforced, and I shall feel called upon to see that it is done, so far as my duty in the premises is concerned.

Lansing, Dec. 23, 1879.

EDWARD CAHILL,
Prosecuting Attorney.

GRAND RAPIDS SANITARY ASSOCIATION.

Soon after the sanitary convention held at Grand Rapids, February, 1880, a sanitary association was organized by citizens of that city. The following letter transmits a copy of its constitution. It is hoped a similar letter may be received from every city and village in the State. The letter is immediately followed by the constitution:

Henry B. Baker, M. D.:

DEAR SIR:—At the last meeting of the Sanitary Association of this city, I was instructed to notify the State Board of Health of the organization of said association, and to transmit a copy of its constitution, which I herewith enclose.

I was also instructed to request a copy of the last Annual Report of the State Board of Health. Will you kindly forward said Report, together with any suggestions or documents that will aid us in our work? Please do so, and when the report of this association is published we will return the favor.

Respectfully,

OFFICE OF THE SANITARY ASSOCIATION,
Grand Rapids, Mich., July 26. 1880.

C. H. MAXIM, M. D.,
Secretary.

CONSTITUTION OF THE SANITARY ASSOCIATION OF GRAND RAPIDS, MICHIGAN.

Article I.—Name.

This organization shall be known as the Sanitary Association of Grand Rapids.

Article II.—Objects.

Its objects shall be:—

1. To promote a general interest in sanitary science, and to diffuse among the people a knowledge of the means of preventing disease.
2. To co-operate with the city authorities in securing the adoption of the most effective methods of improving the sanitary condition of the city.
3. To collect useful information on all subjects pertaining to sanitary science.

Article III.—Membership.

Any citizen of Grand Rapids may become a member by paying the annual assessment of one dollar, and signing the constitution.

Any person residing in the vicinity may become a member on paying the assessment, the name of such person having been presented by a member.

The Mayor of the city, the City Engineer, the City Physician, the Chief Engineer of the pumping works and the Chief of Police; also the members of the Board of Health, and of the committee on health, of the Common Council, shall be *ex-officio* members of the Association.

Article IV.—Officers.

The officers of the Association shall be a President, Vice President, Secretary, and Treasurer. They shall be elected at the first regular meeting in April of each year, by ballot.

Article V.—Executive Committee.

The Executive Committee shall consist of five members. The committee shall secure papers suitable to be read at the meetings; shall make such publications as may be directed by the Association, and, in general, promote its efficiency.

The Association may, from time to time, order such other committees as may be required to carry out its objects.

Article VI.—Meetings.

The Association shall meet monthly, on the second Friday of each month.

Article VII.—Alterations.

This constitution may be altered at any regular meeting, by a two-thirds vote of the whole number of members; or by a majority of the members, notice of the proposed amendment having been given at a previous meeting.

RESUSCITATION OF THE DROWNED.

In his annual report for 1879, as clerk of Bridgewater township, Washtenaw Co., D. W. Palmer mentioned the resuscitation, by the method described in the State Board of Health document on the Treatment of the Drowned, of a boy drowned in one of the small lakes of the River Raisin. In reply to a request, Mr. Palmer sent the following report of the case. It is believed that if parents, teachers, doctors, ministers, and others would take a little pains to become familiar with these rules, and to impart to others the information therein contained, other lives might thus be saved in the State every year. The rules are printed on pages xxxvii–xxxix of the Report of the State Board of Health for 1877, and on pages 95–7 of the Report for 1874. In 1875–6, large editions, in leaflet form and on posters, were printed and distributed to school directors and superintendents and to others in the State. Since their use by persons mentioned on pages xxxix of the Report for 1877, and on page xviii of the Report for 1874, the plates for this document have been loaned to the following persons, who have printed large editions of the document: T. F. Wood, M. D., Wilmington, N. C., C. L. Chamberlain, M. D., Secretary State Board of Health, Hartford, Conn., L. F. Andrews, Secretary State Board of Health, Des Moines, Iowa, C. A. L. Reed, M. D., Hamilton, Ohio.

RESUSCITATION OF A DROWNED BOY IN BRIDGEWATER TOWNSHIP, WASHTENAW CO.

Near the center of the township of Bridgewater the river Raisin makes a bend to the south, and at this bend flows into two small lakes, making it one of the finest skating parks in the State. Our school-house is a little distance on the east side of the lake. On the 15th of January last the scholars went to the lake, and Bert Martin (a lad of 9 years, son of H. Martin of this town), while testing the strength of the ice by jumping, broke through. There was a half-dozen of his playmates with him and some time was consumed before their fright would allow them to think or act. Then the brother of the drowning boy ran to a house some 70 rods distant, procured help, and ran back. By this time the teacher, Mr. A. H. Palmer, hearing the cries, had reached the place. It was some time before rails could be procured with which to reach the hole in the ice, as it was not strong enough to bear the weight of a man. The rails were laid out on the ice and finally the boy drawn out, totally unconscious, having been in the water about a half-hour. Proceeding according to your diagrams and instructions, his lungs were relieved of considerable water. He was then carried to the house above mentioned, and his clothes removed and his body wrapped in warm flannels, and brandy procured by the teacher running to a house half a mile distant and back. Most of the time the boy kept up a subdued moaning but had not opened his eyes when the teacher returned. A little brandy was poured down his throat, which caused a coughing fit in which he ejected the water remaining in his lungs. His limbs and body were chafed until they became warm; and when the doctor arrived the boy was sleeping quietly and was pronounced out of danger. Great credit is due to the document issued by the State Board of Health, as, had all been ignorant of the manner of resuscitating drowned persons, probably the boy would not have recovered.

Respectfully yours, D. W. PALMER,

River Raisin, Washtenaw Co., Mich., March 15, 1880. *Clerk Bridgewater Township, Washtenaw Co.*

ILLUMINATING OILS.

The following reports of lamp-explosions have been received:—

LAMP-EXPLOSION AT HOLLAND, MICH., REPORTED BY H. KREMERS, M. D., OF DRENTHE, MICH.

I send to-day by express a specimen of the oil used by the family of H. Voupell, of Holland City, Mich., whose lamp exploded Aug. 6, 1880. I could get at nothing very definite as to the cause. There is no doubt but that the lamp exploded. The lamp had been used in the family for a number of years, and nothing had ever happened to it, as far as known.

About 8 P. M., Mrs. Voupell lit the lamp. She thinks it must have burned about ten minutes when she heard a report in the room where she left the lamp. Thinking it was the cat throwing something down from a shelf, she did not return immediately. After a few moments, when she did return, the room was in flames. I should be pleased to hear the result of the oil.

Drenthe, Ottawa Co., Mich., Aug. 23, 1880. H. KREMERS, M. D.

The oil received from Dr. Kremers was tested and flashed at 138° F., and burned at 160° F. It would not quite stand the chill-test of exposure for ten minutes to a temperature of 20° F.

RELATIVE TO A LAMP-EXPLOSION AT THE CASS HOUSE IN DETROIT.

OFFICE OF DEPUTY INSPECTOR OF ILLUMINATING OILS FOR MICHIGAN,
Detroit, Mich., Sept., 7, 1880.

H. B. Baker, Esq., Sec'y State Board of Health, Lansing, Mich.:

DEAR SIR,—Yours of the 6th inst., is at hand, and contents noted. I made inquiries at the time of the accident you refer to, in which a servant girl was burned some, but could not learn anything very definite. In the first place the order of the manager was that no lamps should be used on the premises, but it seems this girl had at times sent a bell-boy out to buy small quantities in a bottle, which she had used. There was none of the oil left, from which she had used, so I could not state what she was burning, or its test. The boy who got it had left the hotel, so I could not tell where it was purchased. She said the lamp was a common hand-lamp, but it was all broken by the explosion, and there was no other of the kind at the hotel, so I can't tell you much on that point. She was not obeying orders in using a lamp, and was very much frightened by the accident and may have concealed some things in reference to it; but these are all the facts I learned.

Yours truly, F. W. AVERILL, *Deputy Inspector.*

COMMUNICATIONS REFERRED TO COMMITTEES OF THE STATE BOARD OF HEALTH.

In accordance with the resolution printed on page xlviii, communications to the Board from the following persons have been referred to members of the Board as committees on the several general subjects to which the communications relate. A list of the standing committees of the Board is printed on pages vii–viii. Many special communications not mentioned here are printed on pages 388–458, in the article on Weekly Reports of Diseases. Communications relating to subjects on which the Secretary of the Board is the committee are not included in the following statement.

TO R. C. KEDZIE, M. D.:—

From P. Millspaugh (July 10, 1879), relative to an oil-tester.

From Dr. John H. Rauch, relative to attending the Sanitary Council at Nashville, Tenn., Nov. 18-21, 1879.

From A. J. Harris, relative to compelling, by law, the use of a mechanical safe-guard for circular saws. [Returned.]

From Dr. C. G. Davis, relative to three lamp explosions. [Returned.]

From I. W. Badger, M. D., relative to case of suspected arsenical poisoning by colored hose. [Printed on pages lxxxiii-lxxxiv.]

From D. W. Palmer, relative to resuscitation of a boy supposed to be drowned, [Printed on page lxxxvi.]

From A. G. Gumaer, relative to issuing a circular for tests for poisons and adulterants in food, etc.

TO H. O. HITCHCOCK, M. D.:—

From Phil. Porter, M. D., relative to condition of Grand River at Jackson.

From Marden Sabin, M. D., relative to diphtheria. [Printed on pages 115-117, of the Report for 1879.] Copy of the Secretary's reply to Dr. Sabin. [Returned.]

From C. W, Niles, M. D., relative to erysipelas and puerperal fever. [Printed on page 133 of the Report for 1879.]

From Prof. R. C. Kedzie, Henry F. Lyster, M. D., and Hon. Le Roy Parker, relative to Plan for a National Health Service. [The communications from the two persons first named have been returned.]

From C. W. Marvin, M. D., on an outbreak of diphtheria. [Printed on page 115 of the Report for 1879.]

From Hal C. Wyman, M. D., and Mont. Cassiday, on an outbreak of diphtheria, with the Secretary's questions concerning the same, and their reply. [Printed on pages liv-lvii.]

From Robert Henderson, M. D., relative to erysipelas and puerperal fever. [Printed on page lxxix.]

From R. B. Smith, M. D., relative to cases of diphtheria. [Printed on pages lii-liii.]

From M. Veenboer, M. D., relative to cases of small-pox. [Printed on page lxxvii.]

From Reuben Schurtz, M. D., relative to an outbreak of diphtheria. [Printed on pages xlix-l.]

From Dr. B. Barker, relative to cases of contagious pneumonia. [Printed on page 450.]

From E. Batwell, M. D., relative to cases of small-pox. [Printed on pages lxxvii-lxxviii.]

From Prof. J. C. Jones, relative to diphtheria, with copies of letters to Prof. Jones. [Printed on pages lxx-lxxi.]

From C. L. Howard, relative to communication of scarlet fever by a letter. [Printed on page lxxv.]

From health officers of Fremont, Isabella Co., and of Colfax, Wexford Co., Annual Reports for 1879. [Returned.]

From G. A. Harding, M. D., relative to duties of a health officer. [Returned.]

From Jabez Perkins, M. D., relative to an outbreak of scarlet fever. [Printed on page lxxvi.]

From W. A. Burnham, on difficulties in obtaining statistics of prevalence of scarlet fever. [Returned.]

To Henry F. Lyster, M. D.:—

From Hon. C. D. Randall, relative to disposal of sewage at the State Public School, and a reply to the same, by the Secretary.

From S. Du Bois, relative to a marsh on each side of the Portage River at Unadilla, Mich.

From W. E. Rust, M. D., relative to character of Peninsula township, Grand Traverse Co.

To J. H. Kellogg, M. D.:—

From J. D. Johnson, and a petition from him and twenty-eight others, relative to throwing sawdust and mill refuse into Fyfe Lake. [Mentioned on page 215 of this Report.]

From S. P. Tracy (to Dr. Kedzie), relative to the throwing saw-dust, etc., into streams.

From Dr. D. W. C. Burch, relative to contamination of well by privies.

From Daniel Landon, relative to flooding and laying bare the bed of a millpond.

From A. Warner, relative to hog yard near the writer's residence and his efforts to remove the nuisance.

From N. W. Bacon, relative to a glue-factory being a nuisance.

From Hon. H. W. Lord, synopsis of a schedule showing cause of dependence, and bodily condition, of 12,614 paupers in New York.

To Hon. Le Roy Parker:—

From S. P. Duffield, M. D., relative to pollution of river Rouge, and sickness and death thereby.

From L. De Puy, M. D., and J. H. Jones, relative to compensation and duties of board of health and health officer of Grand Rapids. [Printed on pages 141-4 of the Report for 1879.]

Copy of notice served by the board of Health of Denver township, Newaygo Co., on the White River Log and Booming Company to cease flooding lands in that township, and communication from A. J. Spencer transmitting the same. [Returned.]

From Hiram Coleman, relative to drainage of marshes and lakes in Johnston township, Barry Co.

Copies of two letters from this office to Jas. A. Dumont, and two letters from Jas. A. Dumont, relative to inspection of steamboats; also opinion from the Treasury Department relative to the same.

From Wm. Singleton, relative to duty of supervisor to prosecute for neglect to report cases of diseases dangerous to the public health.

From M. S. Dowling, M. D., on need of municipal law to compel physicians to report to the health officer.

Memorial for abatement of nuisance caused by booms in Muskegon River.

This Eighth Annual Report is respectfully submitted.

Henry B. Baker,
Secretary.

PROCEEDINGS AND ADDRESSES

AT THE

SANITARY CONVENTION

HELD AT

Detroit, Michigan, January 7 and 8, 1880,

UNDER THE DIRECTION OF A COMMITTEE OF THE

STATE BOARD OF HEALTH

AND

A COMMITTEE OF CITIZENS OF DETROIT.

ALSO

An Introduction to the Subject of Sanitary Conventions in Michigan.

INTRODUCTION TO THE SUBJECT OF SANITARY CONVENTIONS.

In his annual address for 1878, as President of the State Board of Health, Prof. R. C. Kedzie, proposed the holding of sanitary conventions or meetings in different parts of the State, to consider and discuss sanitary matters. This was at the regular quarterly meeting April 9, 1878. A committee consisting of Drs. Baker and Kedzie, Hon. Le Roy Parker, and Rev. D. C. Jacokes was immediately appointed to consider the best means of inaugurating such sanitary conventions. It was thought best that each of the conventions should be held by the joint action of the State Board of Health and a committee of citizens of the place where the convention should meet, very much as the Farmers' Institutes are conducted by the joint action of citizens and the State Board of Agriculture.

At the regular quarterly meeting, July 9, 1878, the Secretary presented a letter from Dr. J. H. Beech, of Coldwater, asking the Board to hold one of the proposed sanitary conventions at that place. At the same meeting (July 1878) Rev. Dr. Jacokes asked that the Board hold a sanitary convention at Pontiac. Dr. Henry F. Lyster also invited the Board to hold one of the conventions at Detroit. The Secretary was instructed to make all necessary arrangements for a convention at Coldwater during the Winter of 1878–9. Arrangements were in progress for such a convention, but were broken up by the death of Dr. Beech, Oct. 17, 1878.

At the April (1879) meeting, the Secretary presented a letter from Dr. Peters, of Tecumseh, asking the Board to hold a convention at Tecumseh. At this meeting, the Board voted to hold two sanitary conventions during the Winter of 1879–80, and Drs. Hitchcock, Lyster, and Baker were appointed a committee to manage the details. At the regular meeting, July 8, 1879, this committee reported, recommending that the first convention be held in the city of Detroit, and the second one in the city of Grand Rapids, on condition that the people of the places named will defray the local expenses of the conventions; also that certain influential gentlemen be invited to take part in the several conventions in the way of addresses and papers; further, that these conventions be advertised in several papers and periodicals published in the interests of public health, and that manufacturers and dealers in sanitary appliances be invited at their own expense to forward their goods for exhibition at these conventions. The report was adopted, with instructions to the committee to secure, if possible, the attendance at Detroit and Grand Rapids of prominent sanitarians, and to correspond with manufacturers of sanitary appliances with reference to exhibits by them at these conventions. The committee was also requested immediately to prepare the programs for the meetings at Detroit and Grand Rapids, to notify persons expected to read papers, to correspond with persons expected to exhibit appliances, and to report the completed program at the October meeting of the Board. At the regular quarterly meeting Oct. 14, 1879, Drs. Hitchcock and Lyster from this committee presented the following, which was adopted:—

PLAN OF SANITARY CONVENTIONS,—REPORT OF COMMITTEE.

The committee to whom was referred the matter of arranging for two sanitary conventions to be held during the coming Winter under the auspices of the State Board of Health, respectfully report the following outline of a plan for such conventions:—

TIMES AND PLACES.

1. The first convention will be held in Detroit, at St. Andrew's Hall, on the 7th and 8th of January, 1880.

The second convention will be held at Grand Rapids in ——, on the — and — of February, 1880.

SESSIONS.

2. The convention in Detroit will hold two sessions each day, from 9 o'clock A. M. till 12 M., and from 2 P. M. till 5½ P. M.

The convention at Grand Rapids will hold an evening session on the — day of February, from 7 o'clock till 9½ o'clock, and on the following day will hold a morning session from 10 o'clock A. M. till 12 M., a session from 2 P. M. till 5 P. M., and an evening session from 7 to 9½.

PAPERS, ADDRESSES, AND DISCUSSIONS.

3. During each session of these conventions, there will be one or more addresses or papers on some subject pertaining to public health, and of general interest, each paper to be followed by a discussion of the subject.

OFFICERS OF THE CONVENTIONS.

4. The conventions will be presided over by a President and six Vice-Presidents, all being prominent citizens or eminent sanitarians; and there will be for each convention a resident Secretary.

EXHIBITION OF SANITARY APPARATUS.

5. Manufacturers of all kinds of sanitary apparatus or appliances are to be invited to send specimens of their manufactures for exhibition at these conventions, in accordance with the following regulations, viz.:—

(*a.*) The State Board of Health reserves the right to decline any article not deemed suitable.

(*b.*) A full description of each article proposed to be exhibited must be forwarded to the Secretary of the convention with the application for space.

(*c.*) At these conventions there will be no charge to exhibitors for entrance fee or for wall or floor space.

(*d.*) Exhibitors will pay all expenses of transportation, storage, placing, and removal of goods, and must themselves be responsible for any breakage or damage to their articles.

(*e.*) Every article exhibited, and every model, drawing, or photograph, must bear a descriptive label giving a detailed statement respecting its construction, use, and the price at which it can be furnished, and the name and address of the agent, and the place of sale.

(*f.*) Exhibitors may employ persons to explain their exhibits, and properly to solicit orders.

(*g.*) The position in the hall of articles entered by each exhibitor will be determined by the Secretary of the Convention.

(*h.*) Exhibits will be received by the Secretary of the first Convention from December 15, 1879, to January 6, 1880,—and by the Secretary of the second convention, from the — day of January to the — day of February,—and will be placed in the halls before the opening sessions of the conventions.

6. Competent judges will be invited thoroughly to examine the various articles on exhibition, and certificates of merit will be awarded to such as are deemed worthy of it.

7. The records of the proceedings of these conventions, together with the various addresses and papers read, and a catalogue of the articles exhibited, with the awards of the judges, will be published in the Annual Report of the Secretary of the State Board of Health. Reprints from that of the proceedings of these conventions may contain several pages of advertisements for which there shall be charged the following rates; viz., ten dollars per page, or six dollars per half page, the prepayment of which sums shall entitle the advertiser to 10 copies of the reprint, and to receive other copies at cost.

8. The admission to all the sessions of these conventions shall be free.

9. Programs for all the sessions of each convention will be printed and issued at an early day, with the subjects, and the names of the speakers or writers.

10. Invitations to be present at these conventions will be sent in the name of the State Board of Health to many prominent citizens and eminent sanitarians from abroad.

SUBJECTS FOR DISCUSSION, OFFICERS, ETC.

[As the lists of subjects to be discussed and of officers for these conventions presented with this report were incomplete, and as both are printed, one immediately following, and the other further on, in connection with the proceedings at the conventions, they are here omitted.]

Respectfully submitted,

H. O. HITCHCOCK,
H. F. LYSTER,
Committee.

The following account of the Detroit convention is kindly supplied by C. C. Yemans, M. D., of Detroit, Secretary of the Convention.—HENRY B. BAKER, *Sec. State Board of Health.*

SANITARY CONVENTION, AT DETROIT, MICHIGAN, JANUARY 7 AND 8, 1880.

The first sanitary convention under the auspices of the Michigan State Board of Health, convened in St. Andrew's Hall, Detroit, at 9 A. M., January 7, 1880, in compliance with a call by a committee of the State Board of Health acting with a local committee. The announcement embodied the principal part of the report by the committee, printed on pages 4-5, and which need not be repeated. It contained in addition the following list of officers, and of subjects to be presented:

OFFICERS.

Ex-Gov. H. P. Baldwin, President.
Hon. Jas. Birney, U. S. Minister at the Hague, 1st Vice President.
Wm. Brodie, M. D., 2d Vice President.
Hon. Wm. L. Webber, 3d Vice President.
Prof. J. M. B. Sill, 4th Vice President.
Mrs. J. J. Bagley, 5th Vice President.
Mrs. Morse Stewart, 6th Vice President.
C. C. Yemans, M. D., 84 Lafayette Av., Detroit, Mich., Secretary.

SUBJECTS TO BE PRESENTED.

1. Abattoirs for Cities.
2. School Hygiene.
3. Ventilation of Living and Sleeping Rooms.
4. Cooking-Schools.
5. Plumbing for Dwellings.
6. Prevention and Limitation of Contagious Diseases.
7. Inspection of Food.
8. Water-supply to the Family.

A number of distinguished sanitarians were present, and several manufacturers of Sanitary apparatus made exhibits of their wares. The following is the program of exercises:—

SANITARY CONVENTION.

Wednesday, January 7th.

10 A. M.—Opening of the Convention. Prayer by the Rev. C. T. Allen.

Address by the presiding officer, Dr. Wm. Brodie, of Detroit.

Appointment of committees.

10.30.—Paper by Dr. V. C. Vaughan, of Ann Arbor, on "Contamination of Drinking-Water by Infiltration of Organic Matter through the Soil."

11.—Paper by G. A. Watkins, of Detroit, on "Supply of Milk in Cities."

12 M.—Paper by Alexander J. Murray, V. S., of Detroit, on "Texas Cattle Disease."

1 P. M.—Recess.

2.—Paper by Dr. J. S. Caulkins, of Thornville, on "Methods of Study in Sanitary Science."

3.—Paper by Dr. C. J. Lundy, of Detroit, on "Light in the Public Schools, and School Life in Relation to Vision."

3.45.—Paper by Dr. H. F. Lyster, of Detroit, on "Limitation of Pulmonary Consumption."

4.30.—Recess.

Wednesday Evening.

7.—Paper by Henry W. Lord, of Detroit, on "Sanitary Rewards and Punishments."

8.—Paper by W. F. Craig, C. E., of Detroit, on "Inspection of the Sewerage System of Detroit."

Thursday, January 8th.

9 A. M.—Paper by Dr. Duncan McLeod, of Detroit, on "Ventilation of Dwelling-Houses."

9.20.—Paper by Dr. W. H. Rouse, of Detroit, on "Neurasthenia."

9.40.—Paper by Thomas A. Parker of Detroit, on "Principles of Ventilation."

10.—Paper by Dr. John S. Billings, U. S. A., and Vice-President of the National Board of Health.

11.—Paper by Dr. A. B. Prescott, of Ann Arbor, on "Use of Household Filters for Potable Water."

12 M.—Paper by Dr. R. C. Kedzie, of Lansing, President of the State Board of Health, on "The City of Destruction."

1 P. M.—Recess.

2.—Paper by a lady of Detroit, on "Training Schools of Cookery."

2.30.—Paper by Dr. Carl Jungk, of Detroit, on "Adulteration of Food."

3.—Paper by Prof. J. M. B. Sill, Superintendent of the Public Schools of Detroit, on "School Hygiene."

4.—Paper by Dr. C. C. Yemans, of Detroit, on "Cosmetics."

Reports of committees, and closing exercises.

FIRST SESSION, TUESDAY MORNING, JANUARY 7, 1880.

At 9 A. M. the convention was called to order by the President, Dr. Wm. Brodie, of Detroit. A short prayer was made by the Rev. Charles T. Allen, of the Tabernacle M. E. Church, of Detroit.

The President announced that Prof. R. C. Kedzie, of the Agricultural College, Lansing, President of the State Board of Health, would make a few introductory remarks. Thus called upon, Dr. Kedzie came forward, and made the following address:

WELCOMING ADDRESS.

BY PROF. R. C. KEDZIE, PRESIDENT OF THE STATE BOARD OF HEALTH.

Fellow Citizens.—Just before Dr. Brodie took the stand, he said he was going to call upon me for a few unpremeditated introductory remarks. They must be exceedingly unpremeditated, for I am entirely unprepared to say anything, except that I am very glad to see that you have come here to discuss these questions which have come before us.

Perhaps the question has arisen in your mind "Why should we have this sanitary convention?" We have conventions to guard our political rights, as represented in the various political parties of the country. We have conventions to consider our educational system, and protect our religious rights; and these are recognized as perfectly proper, needing no explanation and no apology. We have conventions to determine great matters of trade and commerce, and this is recognized as right and proper; and amongst the various conventions, I noticed the other day that there was a convention of undertakers, to consider the question how best to put people out of the way when they have got through with all conventions! If we have conventions to decide in regard to our liberties, our political rights, our pockets, our educational rights, and to decide in regard to how we shall be disposed of after we are dead, it seems to me it is certainly proper that we should have a convention to consider the question of how we should live. The question of health is more vital to us than these. Our political and religious rights are very important; we may use them in connection with health, but if we have not health, these other rights pass for very little, except the right of being buried. We have great conventions to determine our social and political rights. Let us have what is more important—great conventions to determine methods and means for securing the best possible health to all the people of this country. For the discussion of these questions we are gathered here this morning. We come not so much to listen to the discussions of experts who have given months and years to the investigation of these various questions; all these are valuable, and we trust will be of great benefit to us; but in addition to these we want to pool all the facts which relate to our public health—to throw them into a common fund, that out of this common fund we may each of us derive the benefit to which we are entitled.

And now, in the discussion of these various topics, we want not only a presentation of facts and theories by experts, but we want the common sense views and opinions and facts which are in the possession of us all, some in the possession of one, and some in the possession of others. Let us bring our knowledge together, into one common stock, that from it we may receive one common benefit.

Prof. Kedzie's remarks were received with approval.

REGRETS.

Letters were read acknowledging the receipt of invitations to attend the convention, from President James B. Angell, of Michigan University; O. W. Wight, M. D., Commissioner of Health of Milwaukee; Hon. W. L. Webber of Saginaw, one of the Vice-Presidents of the convention; Gen. Egbert L. Viele, of New York; Dr. Henry Gibbons, of the Pacific Medical and Sanitary Journal, San Francisco; P. H. Bailhache, surgeon of the United States Marine Hospital Service; Surgeon General John B. Hamilton, U. S. Marine Hospital Service; Chas. H. Fisher, M. D., Secretary of the State Board of Health of Rhode Island; Surgeon General Joseph K. Barnes, U. S. A.; J. L. Cabell, M. D., President, and T. J. Turner, M. D., Secretary, of the National Board of Health; and from others.

THE PRESIDENT'S ADDRESS.

BY WILLIAM BRODIE, M. D., OF DETROIT.

Ladies and Gentlemen of the Sanitary Convention.—It is to me a subject of deep regret that the official duties in the civil department of our system of government prevent the Hon. H. P. Baldwin, who had been selected to preside over this convention, from addressing you on this occasion. I regret it the more as it was unexpected, and the time given me too short to do proper justice either to you, myself, or the interests of this convention. The Hon. Jas. Birney, who was selected to perform the duties of first vice president, is also absent on official business, on whom, in the absence of the president, the present duty should have devolved.

The State of Michigan, feeling deeply interested in the health and longevity of her citizens, by legislative enactment organized a State Board of Health in the year 1873, whose proceedings up to this time have been placed before the people of the State and generally disseminated throughout the Union. The great demand that has been made for these proceedings, and the great interest the public have manifested in sanitary science, suggested to this Board that could a closer relation be brought about with the people and themselves, a much greater good would be attained and a general interest excited that would be of value not only to the citizens of the State but the Board itself. Hence, upon due consideration, it was decided to hold a series of sanitary conventions, the first in Detroit at this time, and the second in Grand Rapids some time later. We have met to-day to inaugurate the first meeting, the Board trusting it may be the harbinger of many future ones.

In classical mythology health was represented in the person of Hygeia, the daughter of Æsculapius, and who was worshiped at Athens, Corinth, Argos, and other important cities, and in works of art is usually represented as a blooming virgin with a snake, the symbol of health, which drinks from a cup held in her hand. From Hygeia has arisen that part of medicine whose object is the preservation of health, and which is properly known as hygiene. It embraces, first, the knowledge of health, both in society and individually; and, second, the conditions that tend to lower that health in producing disease and premature death. The first part of the definition does not come within the range of the object of this convention. It is the second part we have to deal with; to repeat—What are the conditions that tend to lower health, produce disease and premature death? We are taught that "it is not what entereth the man that defileth him," but "what cometh out of the man that defileth him."

Air, earth, water, and fire are acknowledged on general principles as constituting the four great elements, and all are necessary to man's existence. Air, which is composed of oxygen, 20.94 parts, nitrogen, 79.02 parts, and carbonic acid, .04 parts, constitutes what is known as pure air, and any deviation from this standard marks it as impure. Air is the fluid we breathe, and constitutes the atmosphere, and holds floating in its substance aqueous vapors and various terrestrial emanations.

Earth, and here we have reference to that which is known and called soil, and which constitutes that portion of the earth's surface not covered with water or exposed rocks. This is a porous substance and holds in its embrace the washings of the atmosphere and the decompositions that take place upon its surface.

Water, which is composed of oxygen and hydrogen, in the proportion of eight parts of the former to one of the latter, constitutes what is called pure water, and, like the air, holds in solution many other matters which render it impure.

The other element, fire, does not enter into the inquest of the sanitarian, and does not constitute a vehicle either for the holding or conveying the germs of disease, but is in fact a destroyer of everything with which it is brought into contact.

It is with the air and the earth and the water that we are at present interested. Pure air, pure water, and a clean soil are absolutely necessary for a healthy existence to man, and any deviation therefrom when persisted in must ultimately produce disease of some character or other. These aberrations are protean in character, but time will not permit us to enter upon a general investigation of them at this meeting.

For ages past, these investigations have been chiefly conducted by the members of the medical profession under the head of "causes of disease," which although not originally germain to their calling in a mercantile point of view, nevertheless, laying aside the question of profit and loss, they have entered upon the yet higher sphere of "prevention of disease" and the prolongation of life.

The way being thus opened by the medical profession, and the intelligence of the present generation having been thus directed to their own welfare, others have arisen to aid in the prevention of disease and its corollary prolongation of life. Thus to-day the people themselves have taken an interest in their own well-being.

Boards of health were first organized in cities; State boards, by special enactments in many of the States, and the general government by congressional law has organized a national board of health.

In our own State govermental interest has extended even to the townships, and provision has been made by law that all causes of death shall be reported to the State Board of Health.

To those educated in the great phenomena of life, but little difficulty is found in accounting for the causation of disease and ultimate death, and the medical profession have not hesitated to present them to the people. For years they have sounded the alarm, and practically have been powerless to prevent or remove them.

Reform is a tree of slow growth, and it is not until stern necessity manifests itself by unmistakable signs that the admonition is heeded.

The field is large and the reapers are as yet few. To augment the number of reapers is one of the objects of this convention. The State Board of Health have therefore presented for your consideration certain subjects and selected gentlemen to open the discussion.* Both the names of the subjects and the gentlemen introducing them will be found in the program, and the time marked for their introduction. They are all practical, and will be open for discussion and doubtless will occupy the entire time of the session. Some of them, however, have received attention in other conventions of a kindred character; yet much remains to be learned, and especially in their application to human life.

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* [The selection of subjects and of speakers was made by a committee from the Board and a committee of citizens acting together, as stated in the Plan for the Conventions, on page 3.—H. B. B., Sec. S. B. of H.]

There is one subject not in the program, now agitating the people of England and Germany, and which has been introduced into our country, which appears to me to be a retrograde one, viz., anti-vaccination, and seems to be gaining strength by appeals made to the prejudices of the more ignorant classes, and aided by circumstances which sometimes have the appearance of truth.

M. D. Conway, in his London letter to the Cincinnati Commercial, and which has been reproduced in the New York dailies, presents some startling facts (if true) as collated from the expressed declarations of some prominent men in the medical profession in England, Scotland, Germany, and Italy, on this subject. Even the Medical Times and Gazette of London seems to have lost faith in vaccination.

It is claimed by the anti-vaccinationists that other diseases are introduced by vaccination from human lymph into the system which cause more deaths than that by small-pox; and they instance consumption, syphilis, and cancer as the chief diseases which are communicated. They even go so far as to claim that vaccination develops and brings into activity latent diseases that would otherwise remain dormant. In the Popular Science Monthly for January is an article based on the report of Dr. Taylor, chief of the vaccinating corps of the New York city Board of Health for 1874–75, by Dr. R. Osgood Mason, which to my mind exposes fully the fallacy of such reasoning, it being based also on his own personal observation. Were the advocates of non-vaccination honest enough to discard from their statistics all those who have a natural heredity to consumption, cancer, and syphilis, we opine that vaccination would have a much better record, especially if the vaccine virus were taken from those who have no hereditary taint of constitution.

Vaccination from bovine virus must fully meet their objections—that is, if they will admit that there is any protection when vaccination is compulsory, as it is in England (and we think it should be everywhere). Government should provide the bovine virus free, and if not free, at least at cost, and of a standard quality.

Deaths from small-pox do not average more than many other diseases, but it is its loathsome character and the permanent disfiguration that causes it to be so much dreaded. My own experience informs me that by vaccination, repeated if necessary, and with pure bovine virus, small-pox may be prevented, or at least so modified as not necessarily to cause death or disfiguration. The National Board of Health Bulletin for December 27, reports the appearance of small-pox at New York, Philadelphia, Washington, and San Antonio, Texas.

There is another evil which is detrimental to the public health, and which should be remedied, viz., the location of slaughter-houses within the limits of a city or large village.

The great Napoleon Bonaparte, as early as 1807, knowing the injurious results to the public health arising from the private slaughtering of animals for food in the midst of the crowded population of Paris, passed a decree for the erection of public abattoirs outside of the populated portions of the city and on the borders of the river Seine. Other cities in France followed the example; also Brussels, England, and Scotland to a limited extent. In our own city are private slaughtering-houses in its settled portions; and although the solid materials are carted away, yet the animal fluids and washings are allowed to enter the sewers, there to decompose, and the poisonous effluvia, in spite of the traps, arise and mix with the air we daily breathe. For this there is only one remedy, and Bonaparte solved it 73 years ago.

Many are the sources of disease known to the physician that are remediable, but the shortness of time given me prevents my recording them. There is material enough to fully occupy your time, and if the people can only be aroused to a sense of their own safety the objects of this convention will be in a measure accomplished and prove the harbinger of others in the future.

Another object in holding this convention was to give an opportunity for the manufacturers of sanitary appliances, specialties, or machinery to bring them forward for general examination. You will find that some manufacturers have accepted the invitation. I would therefore suggest that a committee be appointed to examine such articles as may be presented, and report their observations and recommendations to the convention.

Prof. Victor C. Vaughan, of the University of Michigan, read the following paper, entitled

CONTAMINATION OF DRINKING-WATER BY FILTRATION OF ORGANIC MATTER THROUGH THE SOIL.

BY VICTOR C. VAUGHAN, M. D., ASSISTED BY P. E. NAGLE.

There seems to be quite a widespread belief that in disposing of decomposing organic matter it is only necessary to remove it from sight by burial in the earth. All through the rural districts and in the towns and many small cities of this country, privy-vaults, cesspools, and even cemeteries are located in close proximity to cisterns and wells. A few feet, or at most a few rods, of intervening soil are considered as sufficient to prevent the contamination of the water from these receptacles of decomposing matter. There is a general belief in the power of the soil to retain, or to remove in some way all organic matter from solutions. Not infrequently a privy-vault may be seen located within 10 or 20 feet of a well or a cistern, and often the slope of the land is toward the well or cistern. During the past three months the authorities of a growing village in the interior of this State have, in spite of the remonstrance of certain citizens, located a cemetery within a few rods of a deep well the water of which is used for household purposes.

During the Summer of 1878, the sanitary condition of certain premises in Ann Arbor was as follows: The cistern located at the rear of the house, was about 20 feet deep, and above six feet below the surface it leaked. Of course, if water could pass out it could as readily pass in. Fifteen feet back in the yard, and slightly elevated, stood the privy. As soon as the warm months of summer came on, the water of the cistern became so offensive that it could not be used. The odor was that of the privy, and the water swarmed with microscopic animalculæ, and with others large enough to be seen with the unaided eye. All the water was removed and the cistern thoroughly cleansed. A few days later a heavy rain refilled the cistern, but within a few weeks more the water again became unfit for use, but was not so bad as it had been before the cleaning. During the remainder of the Summer and Fall the family obtained their drinking water from another source. During the winter season the water of the cistern so improved that after being filtered it could be used. But as soon as the warm weather of the following Summer approached the water again became unfit for use, and was almost or quite as bad as it had been during the previous Summer. This is only an illustrative case, and I know of similar ones in Ann Arbor.

Such instances as this caused us to doubt the power of soils of completely preventing the filtration of organic matter in solution. We decided to endeavor to answer, by experimental investigation, the following questions: (1.) To what extent are organic substances removed from solution by filtration through soil? (2.) Do different soils differ in their capability of thus removing organic matter? It must be noted here that the organic substances to be removed are held in solution, and not merely in suspension. The principal object in the filtration of natural waters for the supply of towns and cities is the removal of suspended matter. Again, the waters, with which our experiments are concerned, and with which, as we will endeavor to prove, drinking-water is often contaminated, should be designated as *polluted* water, *i. e.*, the amount of injurious substances which they contain is sufficiently great to render their direct use dangerous.

The first thing necessary to an investigation of the first question was to select some soluble organic substance, for which there are known exact methods of quantitative determination; for it would be necessary to determine the amount removed from solution by making quantitative determinations of the amounts in solutions before and after filtration. For this purpose urea was selected, and in order to have the conditions as natural as possible, the solution selected for filtration was urine. Urea is also easily decomposed, and experiments performed with this substance would have the advantage of the conditions being most favorable for the removal of the organic substance. It is well known that urea is but one step removed from inorganic matter, and that its transformation into carbonic acid and ammonia is easily accomplished.

One cubic foot of the ordinary gravel soil, from four feet below the surface, was obtained and so arranged that fluids could be poured upon its surface (which was one foot square) and the filtrate collected. The amount of urea in a specimen of urine was then estimated with mercuric nitrate (the chlorides having previously been removed), a measured quantity of this specimen was poured upon the surface of the soil, and the urine which passed through was collected, measured, and its contained urea estimated. A certain amount of urine (which was equal to that passed by one person during 24 hours) was poured upon the soil at one time. The filtrate from this was collected, measured, and its contained urea determined. This was repeated for a number of days, or until the filtrate was found to contain as much urea per 100 cubic centimeters as the urine before filtration did. The results of these experiments are given in the following table.

	Urine poured on Soil. Cubic Centimeters.	Urine passed through. Cubic Centimeters.	Total Urea poured upon the soil. Grams.	Total Urea in the Filtrate. Grams.	Urea per 100 C. C. before Filtration. Grams.	Urea per 100 C. C. after Filtration. Grams.
First day	1,760	938	49.30	15.00	2.8	1.6
Second day	965	740	25.07	14.06	2.6	1.9
Third day	860	600	13.76	9.60	1.6	1.6
Totals	3,585	2,278	88.13	38.66	7.0	5.1

This soil, which had now become saturated with organic matter, was removed from the filter, spread out upon a clean board so as to be exposed to the air, left in this condition for 24 hours, then returned to the filter. Urine was poured upon this soil, and the amount of urea removed by filtration was estimated as before. In this case it was found that the urine, before filtration, contained 2.1 grams of urea per 100 cubic centimeters, and after filtration, only 1.6 grams; or the soil which had been saturated with the organic matter was so far purified by exposure to the atmosphere for 24 hours that it now removed one-half gram of urea from every 2.1 grams poured upon it in solution.

From these experiments it is very evident that the ordinary gravel, which constitutes so large a proportion of the soil of a part of this State, has but little effect in removing or oxidizing soluble nitrogenous substance from solutions which are allowed to pass through such soils. Furthermore, it became evident that such soil soon becomes saturated, and then no longer has any effect upon the removal or oxidation of these organic substances. The amount of urea necessary to thus saturate one cubic foot of soil was 88.13 grams, or that contained in 3,585 cubic centimeters of urine. Of course this urine contained a small quantity of other organic substances, so that we shall not claim that the following computations are exact; but we will be careful not to overstate them. Suppose that the total solid excretions of an adult are 112 grams per day (this of course is very low), then the solid excretions from a family of six persons each day would be sufficient when properly dissolved to saturate over seven cubic feet of gravel soil. From this it is evident that only a few weeks or months would suffice, with a proper amount of rain-fall, to saturate every cubic foot of soil to the depth of five or ten feet in a small yard, in which we often find privy-vault, cesspool, and cistern or well in close proximity. Of course if these substances are not destroyed by filtration they will be carried with the water which passes through the soil wherever such water may go. If the water gains an entrance to the well it will carry with it the substances in solution. At this rate it would require more than a few feet or even rods of intervening soil to prevent the contamination of the water of wells or leaky cisterns from privy-vaults, which often are not cleaned once a year, or from cesspools or cemeteries.

But there is another consideration that must be mentioned in this connection. The gravel by itself forms one of the poorest of filters, because the particles are not all of the same size and shape, consequently the interspaces are also of unequal size, and the liquid, meeting with less resistance in one direction than in others, soon collects and forms streamlets which may convey the polluted water in quantity toward, or even into, the source of the water used for household purposes.

This brings us to a consideration of the second question proposed to be decided by experimental investigation, that is, do different soils differ in their capability of removing organic matter from solution? The gravel having already been tried, we did not make any further experiments with it; but we next experimented with sand and loam in the same manner as we had done with the gravel. The comparative results only will be of interest. While urine (3,585 cubic centimeters) containing 88.13 grams saturated one cubic foot of gravel, urine (4,000 cubic centimeters) containing 89 grams of urea did not saturate one cubic foot of loam, but after this amount had been used the loam still removed four-tenths of a gram of urea from each 100 cubic centimeters of urine. The sand also was better than the gravel, but was not so good as the loam, for 88 grams of urea in 4,000 cubic centimeters of urine did not saturate the sand which still removed two-tenths of a gram from each 100 cubic centimeters. Thus, of the three—gravel, sand, and loam—the loam is most active and the gravel least active in the removal of organic matter from solution.

The explanation of this we conceive to be as follows: First, the unequal size and variety in the shape of pieces of gravel (as has already been referred to) allows the formation of streamlets, and the solution thus passes through the gravel more rapidly than through either the sand or loam. This is a physical defect in the gravel as an agent for the removal of the organic matter. A second cause is the greater porosity of the loam. As was shown by the renewed activity of the gravel after it had been exposed to the atmosphere for 24 hours, oxygen is the agent which acts chemically in the destruction of organic matter, or rather, in its conversion into inorganic matter. Now the more concentrated the oxygen, the more energetically will it act. As is well known, the atmosphere in the minute pores of the soil is condensed.

Oxygen has justly been termed the scavenger of creation, and the free access of this gas is necessary in order to render the excretions of animals harmless. This good work is begun in the living body; for the hæmoglobine of the red blood corpuscle carries oxygen to all the tissues; and by the action of this oxygen, poisons introduced from without and poisons generated within are rendered inert and fitted for excretion.

"Animals are formed by the agency of plants out of the constituents of earth and air. Whatever in our bodies is inorganic originated in the soil; whatever in our bodies is organic originated in the atmosphere. Whatever in our bodies is inorganic will return to the soil; whatever in our bodies is organic will return to the atmosphere. The carbon of the carbonic acid of the air becomes the carbon of the cellulose, starch, gums, resins, etc., of plants: it becomes the carbon of our blood and muscle; and from our bodies it is returned to the air. Thus the changes of matter form an endless chain whose first link is also its last link".—(Gorup-Besanez.) Now the agent which converts the organic tissues of the animal into inorganic substances is oxygen, and this is the proper agent to use in rendering animal excretions harmless. This is the reason why the dry-earth closet with a pipe to conduct the gases into a separate ventilating shaft reaching above the roof is the best method (at least for the rural districts and small cities and villages) of disposing of fæcal matter. The dry earth takes up the oxygen, which is then condensed in the pores and thus acts with double energy. Instead of burying these substances down in the earth where but a limited supply of oxygen can reach them, it is far better to allow the free access of the atmosphere. Burial simply aids in the preservation of organic substances, and, as we have seen, they may be carried under the ground into our wells and thus poison us. Instead of simply burying these noxious substances and then thinking ourselves secure from them, it would be far better to render them inert and even useful, as may be done.

As to the location of cemeteries in the vicinity of wells, we think that our experiments show that the decomposing matter from one body would be sufficient to pass a long distance, especially through a gravel soil, before it would be completely destroyed.

DISCUSSION.

Dr. Kedzie said he had examined the water from a large number of wells in Lansing, and vicinity, which was used for domestic purposes in familes where typhoid fever prevailed to an alarming extent, and in every instance had found the well-water contaminated with decomposing organic matter. He alluded to the outbreak of a low form of fever a few years ago in a certain alley in Grand Rapids. The Fulton Street Cemetery is a pervious sand on the surface, but is underlaid by a bed of impervious clay at a depth of 15 to 18 feet: this slopes down towards the wells on the alley, and nearly every family living on this alley and using the water from these wells had the fever. He thought this was a great outrage, the extent of which was not comprehended. These poor families appear to have been drinking a cold infusion of death! To show how far the graveyards might pollute the water of wells, he had examined a well 30 rods from the nearest grave in another cemetery, and found unmistakable evidences of contamination. He tried to find the history of the people who lived in the house; but it was significantly marked "To let."

A vote of thanks was extended to Dr. Vaughan for his able and interesting paper.

A paper on the Texas Cattle Disease was then read by Alexander J. Murray, Veterinary Surgeon, of Detroit. The paper is as follows:—

TEXAS CATTLE DISEASE.

BY ALEXANDER J. MURRAY, V. S., OF DETROIT.

The contagious diseases of cattle are of great interest to the sanitarian. The most formidable and fatal disease to which cattle are subject in this country is known as the Texas cattle disease or Spanish fever. The home of this disease is on the plains of Texas. Texas cattle are sold cheap, as the cost of raising cattle in that country is comparatively small; this leads to their being carried to many other parts of the United States where cattle bring a higher price, and wherever those cattle are carried the disease is spread.

The Texas cattle disease is a contagious fever, and is characterized by an increase of temperature even before the first symptoms are observed. The early symptoms are dullness, want of appetite, hanging of the head, diminished secretion of milk, back arched, hollowness of the flanks, and pulse quick and weak, varying from 90 to 100. In the early stage of the disease the bowels are often constipated, though this condition of the bowels is frequently succeeded by diarrhea. In the advanced stages the animal is frequently comatose and often becomes paralytic, and the breath has generally a very offensive odor. The urine is also dark-colored.

The flesh of animals which have suffered from this disease has a darker appearance than natural and decomposes rapidly. The blood has a dark, tarry appearance, and has little tendency to coagulate. The liver is congested, and the gall-bladder distended with bile; the spleen much enlarged and softened in structure; the three first stomachs present a normal appearance, but the mucous lining of the fourth is inflamed, more or less eroded, and presents patches from which the mucous membrane has sloughed off; the intestines are congested and the fæces are in quite a liquid condition even though constipation may have been present. The fæces have a very yellowish tint which is owing to the secretion of bile being excessive. The kidneys are usually congested, and the bladder filled with dark-colored urine. The dark-colored urine is a very characteristic feature of the disease, and has led to the suggestion being made to term it the "Black Water of Texas."

The disease is not contagious at all seasons of the year, as cold weather prevents the development of new cases, so that the disease disappears when the weather becomes frosty, and does not make its appearance until the cold weather of Spring is succeeded by the warm weather of Summer. The contagious nature of the disease has been assigned to the presence of a minute fungus in the bile, which was discovered in 1868 by Dr. Stiles, of New York, and this view is borne out by the fact that healthy cattle when driven along a road over which Texas cattle have traveled, contract the disease. It is not necessary that the Texan cattle should be sick to spread the disease, as those which have every appearance of health infect the road or pasture over which they pass. A similar fungus has been discovered in the blood, and the blood corpuscles have a shrivelled crenated appearance, and it is to their breaking up or disintegration that the dark color of the urine is owing. The disintegration of the blood corpuscles is owing to the presence of an excess of bile in the blood, which has a solvent effect on them. That there is an excessive quantity of bile in the system is evident from the yellow tint which the fat presents. The contagious nature of the disease has been very generally attributed to the passing of ticks from Texan to other cattle; the ticks are very frequently found on cattle suffering from this disease, but it does not appear that their presence is at all essential to the development of the malady.

It is evident that the flesh of animals suffering from such a disease is unfit for human food; but for some years past it has been the practice in Detroit to kill animals as soon as it was discovered that they were suffering from the disease, for the purpose of selling them to the public. The best way of putting a stop to such practices is to prevent the introduction of the disease, which is brought here by Texan cattle. An act was passed by the Legislature in 1869 to prevent the introduction of Texan cattle between the 1st of March and the 1st of November, but as no means have been provided for carrying the law into operation, it is practically disregarded.

It is impossible to state exactly the number of animals which are lost by this disease; but it is probable that not less than 400 head of cattle are annually lost in Detroit and its vicinity through this disease. Estimating each animal at $40 a head, an annual loss of $16,000 is represented. It is, therefore, very desirable, both on economic and sanitary grounds, that an amendment should be made to the existing law, to prevent the great loss which cattle owners annually suffer from this scourge, and at the same time to prevent the sale of diseased meat, which must have a very injurious effect on public health.

DISCUSSION.

Dr. Brodie asked the speaker if he knew of any marks by which the diseased meat could be distinguished by non-professional people.

Dr. Murray said he did not, except that it had a dark and bloodstained appearance, and the meat decomposes very rapidly.

There was considerable discussion as to the origin of the disease. Dr. Murray said it was not so fatal among Texan cattle as northern cattle. He knew of cases where cattle had acquired the disease from passing over the same road that Texan cattle had been driven over recently. The same was true of cattle which had been pastured in the same field where Texans had been kept. He regarded the disease as possibly the result of a fungus growth. Cattle in the western part of the city, where Texans were driven, were subject to the disease, while those in the eastern part were not.

Mr. Lord inquired if Texan cattle acquired the disease during their transportation, or whether the disease was indigenous to Texas.

Dr. Murray said it was probably aggravated by exposure during transportation, but that it existed in Texas.

There was some discussion as to whether a commission on the subject of the Texan cattle disease had been appointed by the Governor, as the result of which Dr. Kedzie offered the following:—

Resolved, That it is the sense of this convention that it is expedient, if the Governor has not appointed a commission to investigate the spread of this disease, that such a board should be appointed; and that the Governor be earnestly memorialized by this convention to call attention in his next message to the necessity of an appropriation for this purpose, to secure the stock-men of the State, and protect the health of the State.

The resolution was carried, Dr. Kedzie was appointed to prepare the memorial to the Governor, and a vote of thanks was extended to Dr. Murray for his paper.

The convention then took a recess till 2 P. M.

Second Session, Tuesday P. M., Jan. 7, 1880.

The attendance was larger than in the morning, and the number of ladies present was quite noticeable. The convention was called to order at 2.30 P. M., and after the appointment of the following committees, the regular program was resumed.

The President announced as committees to examine and report upon the exhibits:—

On Water-Closets and Baths—Dr. V. C. Vaughan, of Ann Arbor; Dr. Hartsuff, U. S. A., Fort Wayne; Hon. Le Roy Parker, Flint.

On Odorless Excavators, etc.—Dr. A. F. Whelan, Hillsdale; John Hosmer, Detroit; Dr. Henry B. Baker, Lansing.

On Cooking-Utensils—Dr. R. C. Kedzie, Lansing; Dr. E. S. Snow, Dearborn; Mrs. F. E. Dingman, Detroit.

On Sanitary Publications—Dr. John H. Kellogg, Battle Creek.

The first paper on the afternoon program was one on Methods of Study in Sanitary Science, by Dr. J. S. Caulkins, of Thornville. The President announced that Dr. Caulkins was suffering from a severe cold, and the paper would be read by the Secretary.

METHODS OF STUDY IN SANITARY SCIENCE.

BY JOHN S. CAULKINS, M. D., OF THORNVILLE.

It is the faith of the philanthropist and sanitarian that all diseases are preventable, or to speak more accurately, will be found to be so, when an exact knowledge of their causes becomes a part and parcel of science. We are, however, in the present state of our knowledge, or rather of our ignorance of the causes of diseases, obliged to admit that no one of them is entirely preventable, and most of them only so to a very limited degree. To illustrate the extent of our want of knowledge of the nature and conditions of the causes of diseases, reference may be made to small-pox and ague, two complaints in which our methods of prevention have met with the greatest amount of success, but in which they frequently meet with unexpected and unexplained failures. With respect to the first named, we sometimes observe that vaccination, even when repeated and apparently successful, does not afford protection against severe attacks of the disease. In ague and other diseases caused by malaria, drainage holds the same position as a preventive measure that vaccination does in the small-pox, but occasionally the best drained sections of country suffer with severe epidemics of malarious diseases. An instance in point of this fact can at present be noted in a part of Orange county, New York, 12 miles west of the city of Newburg, where chills and fever, formerly a rarity, are now common and severe, even pernicious and fatal, although the locality is hilly, free from swamps and stagnant water, with excellent natural drainage by the Walkill river and its tributary brooks, rapid-flowing streams with rocky banks. A singular fact that deserves mention here, and still further illustrates our ignorance of causes and conditions, is, that the oldest inhabitants recollect that a similar epidemic of intermittents following a period of healthfulness was prevalent for a few years in the same locality more than half a century since. Such facts as the above in connection with a disease to whose causes we have a better clue than to those of any other, put in a striking light the paucity of our information with respect to the rest, and painfully reminds us that we are only working around the edges of the vast field which nothing but labor can clear of its entangled forest.

It is not the intention of this paper to give an exhaustive treatise on what is known already about the prevention of diseases; it is rather its design to call attention to the nature of the work that lies before us, and to the methods that we must adopt in order to extend the sphere of our knowledge and discover new safeguards to the public health. For the purposes, then, of this paper, diseases instead of being considered in detail can be arranged in three classes, the non-infectious, the infectious, and the doubtful—that is, those to which an infectious nature is conceded by some and denied by others. A complete classification will not be attempted here, and indeed could not be made, for opinions vary widely as to the infectious nature of many diseases—so widely that a classification is only the expression of an individual opinion. There are quite probably those present that deny the infectious nature of diphtheria; others, that of scarlet fever; others, that of typhoid fever; others, that of dysentery; that of yellow fever even has been disputed. On the other hand, there are those who believe that consumption, pneumonia, and various diseases not commonly so classed, are infectious. Classes, then, in this connection are spoken of merely to point out the variations in the methods of the work which each class requires in order to throw more light on the nature and conditions of its causes.

These methods of work are two, both of which are indispensable and apply to the three classes of diseases with essential variations. They are,—

(1.) The collection and compilation of statistics of all sorts with reference to each particular disease;

(2.) The research, physiological, chemical, and microscopical into the ultimate nature of tissues and their behavior under all sorts of circumstances, and after the possible discovery of the *materies morbi* of every disease, if such entities exist.

Neither of these methods can be overlooked, although their relative importance varies in the three classes of disease. In the first class, the non-infectious, research is the most important, and is preliminary to the use of the statistical method. Take, for illustration, rheumatism, a disease not as far as known ever claimed to be infectious, and although we may be aided we can never get very far on our road to the discovery of its cause or of its nature by the study of statistics alone. The same remark may be made concerning dyspepsia, liver complaint, and generally concerning the non-infectious diseases. It is research that is wanted here, research into the chemistry of the blood and the other tissues, the processes of nutrition, and into the structure and functions of the living organism and all its relations to the external world. After these inquiries have so far brought us on our road that we are positively able to say where the first change is that separates disease from health—can, so to speak, put the finger on the initial point of disease, the primary modification that marks the abnormal—then statistics may be of immense use to us in determining the conditions and circumstances that cause the change.

In the pursuit of these studies into the ultimate nature of tissue, its change from the normal and the influences that determine it, we must not (and the remark applies equally to the collection of statistics) rest satisfied to confine our investigation of disease to the human species. That is not the place to begin the study of preventive medicine. We must first study the diseases of the lower animals. Preventive medicine can never be scientific till it is first comparative. We must begin away down among the invertebrates and climb up to our own level, bringing with us whatever we may learn on the way that can throw light on our own diseases. The idea that the human races are something apart from the rest of the animal kingdom has been effectually disposed of and sunk out of sight by modern science in the well in which truth used to be hidden, but from which she is beginning to emerge to be replaced by this and similar old time errors. It is now seen that we are in no such way discrete from the rest of the animals, but like them are subject to hunger, thirst, heat, cold, gravitation, and all other natural forces, the undue operation of which determines the production of diseases. We are merely animals, complex indeed compared with the rest in tissue and constitution, but merely animals. Simpler tissues imply simpler diseases, and since the only scientific way to begin any pursuit is with its elements, it is quite as absurd to begin our studies of diseases with our own, irrespective of those of the lower animals, as it would be to require a boy to learn to extract the cube root before he had mastered the multiplication table.

Coming to the second class of diseases, the infectious, we will see that the plan of the work is reversed, statistics being wanted first. These diseases may be subdivided into the personally infectious, of which measles and small-pox are examples, and the locally infectious, of which ague is an example; and in both the collection and collation of statistics is the preliminary and indispensable work.

The questions to be answered in the first subdivision, the personally infectious, are several and of vital importance. These are some of them:—

(1.) Does any one of these diseases ever spring up *ab loco,* on the spot, spontaneously, or is it always propagated from an antecedent case? Small-pox is perhaps the only one of the class, the strictly contagious, like itch, being excepted, for which a unanimous vote could at present be secured on the above question. It is doubtful if those would not be found that would contend for a *de novo* origin for measles, as many notoriously do for typhoid fever, yellow fever, scarlet fever, and diphtheria, to say nothing about such diseases as epidemic dysentery and Asiatic cholera. These differences of opinion are discreditable to us, and nothing but statistics can settle them.

(2.) Can the variations in the malignancy of type of different epidemics of the same disease be accounted for by any known conditions, or do they potentially exist in the virus itself? It would be useless to urge the vast importance of the answer to this difficult question. If the last supposition is true, we must submit as we may,—if the first is true, humanity loudly demands to know what these conditions are, for "forwarned is forearmed." The true answer lies wrapped up in a sufficiently large body of well interrogated statistics.

(3.) Is there any subjective phenomenon by which an exposed person can be made immediately aware of the contraction of the disease?

(4.) How long in the case of each of these diseases does the virus retain its activity?

(5.) What are the means by which transportation of the seeds of disease is effected? Attention should be given under this head to possible agencies of transportation not yet much suspected; for instance, to the ubiquitous peddlers. It is possible that inquiry will show that they are the main agents in spreading the deadly poison of diphtheria into localities remote from the railways. Old paper money has been suspected of being the vehicle for disease germs, and if it is so, statistics should show that those classes of people that handle it are the most liable to attacks. If the reverse is shown to be true, and bank tellers and merchants are no more subject than other classes to infectious diseases, then paper money and paper goods of all kinds may be cleared of the suspicion of carrying the seeds of the severe infectious diseases. That old musty books will cause the influenza the writer has had good reasons for believing.

All of the above questions are practically important, and within the capacity of well digested statistics to answer. With respect to the locally infectious diseases the statistical is the only method that can connect facts like the one mentioned above concerning ague in Orange county with its determining circumstances, and show whether the malarial cause was in the drinking-water, whether it was brought by winds from a distance, or whether unusual meteorological conditions, like heavy rains or dews assimilate the locality for the time being to the conditions of permanently malarious places. Many other points of interest can be settled in the same way, and when they are we can get along very well even if we are obliged to remain in ignorance of what malaria really is.

So of the personally infectious diseases. If the questions referred to above, and others that would grow out of them, can be settled beyond controversy, we can do, even if the *materies morbi* of each malady forever eludes our search. We would still be in as good a position as the chemists and physicists are, to whom the molecular theory answers excellently, although they never saw and never hope to see the ultimate molecule of matter. Similar remarks may be made concerning the yellow fever. If by the aid of statistics we first decide (and this is but an easy task) whether it belongs to the personally or the locally infectious diseases, and if found to be local, then, by the compilation of a sufficiently large amount of data, can find what the substrate is on which the poison breeds and lives, we will be in a position to avoid and control the disease to a great extent, unless indeed the atmosphere itself is that substrate, and perhaps money and work enough could do so in that case.

Reaching the third class, or the disputed diseases, we see again in their case the superlative necessity of the same method, for it is that which must remand each of them to one of the other two classes. The existence of this class of doubtfully infectious diseases is one of the *approbria medicorum*, but the fact of its existence is undeniable and glaring. The writer has two friends for whose opinions he has the greatest possible respect, one of whom believes in the *ab loco* origin of both diphtheria and scarlet fever, while the other holds to it in the case of diphtheria, but is strenuous in the belief that scarlet fever is *always* propagated. Some of the most respected leaders of medical opinion in this and other States teach that typhoid fever is generated in collections of filth, others believe in its filiation from an antecedent case.

The statistical method is abundantly competent to settle, and is the only method that can effectually settle these disagreeing opinions.

It remains to speak of experiment to find out specifics for diseases. This might be counted by some to be a third method of work, but is in reality a combination of the two mentioned, being tabulated research. It is one of our most promising fields of work, for though we have as yet specifics for very few diseases, this is no ground for discouragement, for the few we have are a prophecy of the fact that the time is coming when we shall have a specific for every one.

The foregoing remarks show the importance to sanitary science of the statistical method, and the field is an open one in which we all can labor. Research needs money and leisure more than many of us have to spare, but the collection of the statistics of disease is a work for which we have all of us more or less time and opportunities, though no individual can collect facts enough to answer the requirements of research by the statistical method, which calls for the use of large numbers to eliminate errors incident to observation in limited fields, each individual observer may contribute; and even though no single person can afford, in the interests of the public, to collate such large numbers as are required, the State may, and in Michigan does do this work.

If the question should be asked what statistics are the most needed, it would not be easy to give an answer. All statistics may be of use. As we can never tell where lightning will strike, so we can never tell from what collections of facts the first glimpses of truth may flash out from the darkness of our ignorance. Every fact in connection with an epidemic of disease however minute, short of saying that the sun rose and set, may be of service in some way not known to us. We are apt to think that to be useful facts should sustain some favorite theory, but they are really just as useful if they destroy that same theory.

Let us all then, irrespective of theory, conscientiously record such facts concerning disease as fall in our way, and in this manner each do his part toward the cause of sanitary science and the prevention of disease.

A vote of thanks was tendered to Dr. Caulkins.

The President announced that an invitation had been received from Capt. Joseph Nicholson, Superintendent of the House of Correction, to visit that institution and inspect certain improvements in ventilation. He suggested that if the Convention did not think they had time to visit the House of Correction *en masse*, they might appoint a committee to visit the institution.

On motion, the President appointed Dr. C. M. Stockwell, of Port Huron; Dr. George B. Russell, of Detroit; the Rev. D. C. Jacokes, of Pontiac; Dr. Geo. E. Ranney, of Lansing; Hon. Henry W. Lord, of Detroit, as such committee, with instructions to report to-day.

Dr. C. J. Lundy, of Detroit, read the following paper on "Light in the Public Schools and School Life in Relation to Vision."

LIGHT IN THE PUBLIC SCHOOLS, AND SCHOOL LIFE IN RELATION TO VISION.

BY PROF. C. J. LUNDY, M. D., OF DETROIT.

LADIES AND GENTLEMEN:—School life and school hygiene are subjects replete with interest, and are well worthy the attention of the *savant* in the domain of sanitary science, and it is to be regretted that so little has been said or written upon a theme so important. When we consider the number of years spent at school, the long hours of study, and the important changes going on in the human economy in early life, it is certainly surprising that so little thought and attention have been given to subjects which so intimately concern the comfort and well-being of our children.

When we consider in how many instances eye-disease of an incurable character owes its origin to school-life, we cannot avoid the conclusion that modern education is not an unmixed blessing. When we observe the array of brilliant names whose possessors have done so much for the advancement of ophthalmic science, we may question whether the ounce of prevention has not sometimes been lost sight of in the eagerness to perform some dazzling cure.

That the prevention of disease is of paramount importance to its cure will be admitted as a fact, and this must be my apology for calling your attention briefly to some of the ill effects of school-life and the best means for their prevention. Many observations have been made regarding the influence which school-life exerts upon the visual organs and upon the eye-sight itself. These observations have been made at various places in Europe as well as in our own country; and while they show slight differences in some respects, the conclusions arrived at agree in all essential particulars. Indeed, we seldom see such uniform conclusions, drawn from observations made at points so widely distant and by so many different observers. These conclusions, based upon the examination of many thousand children, show beyond doubt that modern school-life, with its surrounding circumstances, is an important factor in producing serious and permanent changes in the eye, and consequent limitation of vision. Nor are these the only ill effects of school-life with bad hygienic surroundings, for the eye may suffer, though less seriously, in various other ways. Considered as optical instruments few eyes are perfect, and yet in a majority of cases the defect is so slight that emmetropia (natural sight) is found in most young children. Slight optical defects cause comparatively little disturbance of vision in early youth, except after prolonged use of the eyes, or when the light is poor, or when the body is fatigued. Three forms of optical defect are found among children, viz.: hyperopia (far-sight), myopia (near-sight), and astigmatism.

We will consider very briefly the first of these, while the importance of the second demands something more than a passing notice. The hyperopic eye is one whose axis is too short, in consequence of which it becomes necessary, even for distant vision, to bring into play a part of the accommodative power of the eye through contraction of the ciliary muscle. Now, if distant objects are not seen distinctly unless by an effort of accommodation, it will require a strain upon the ciliary muscle, and also upon the internal recti muscles to enable the hyperopic eye to properly focus the image of near objects; and the nearer the object is brought the more divergent will be the rays of light proceeding from it, and the greater will be the strain required to focus these rays upon the retina. If the light is deficient, or if it comes from a wrong direction so that the shadow of the body falls upon the object (a book for example), it must of necessity be brought close to the eyes. Although the pupil is often unable to explain why he sees better if the object is brought within short range, yet he knows from experience that such is the case. The amount of light reflected from any given surface varies inversely as the square of the distance of the object, and hence if a book is held eight inches distant it reflects more than twice as much light upon the eye as if it were held twelve inches distant. Thus it will be seen that bringing the book close to the eyes is, in one respect, equivalent to increasing the amount of light. Aside from this, the size of the retinal image is increased if the object is brought nearer, and although the strain is greater, we frequently see far-sighted pupils bring the book close to the eyes. The result of this strain, which is intensified proportionally as the light is poor, is the exhaustion of nervous and muscular energy, in consequence of which the letters first begin "to blur," then "run together," and finally they can no longer be distinguished. After a few moments rest the work is again resumed, only to be again interrupted by the same tired feeling, the same blurring of the letters; and the pupil often becomes disheartened and discouraged, and votes school a humbug and study a bore. Nor is the tired feeling, the blurring of the letters, and the discomfort the only trouble arising in such cases; for if the optical defect, the insufficient light, and other bad influences are not remedied, congestions and inflammations may soon make their appearance, and any persistent effort to use the eyes only adds to the distress.

Even the emmetropic (natural) eye does not escape the ill effects of overuse, bad and insufficient light with poor ventilation, etc., and although the discomfort is trivial when compared with that experienced by the far-sighted individual, yet the difference is only one of degree, while many emmetropic eyes become myopic, or nearsighted, as numerous statistics will show.

But it is in myopia, with its attendant evils, that the worst results of school-life are to be seen; although they are by no means alarming in this country, when we compare them with the existing state of affairs in Germany.

From the examination of more than 25,000 school children and students both in this country and in Europe, it has been shown that near-sightedness increases to a very great extent during school-life.

Let us briefly consider what myopia is, what are its causes and what are its effects. Near-sightedness, or myopia, indicates that condition of refraction in which parallel rays of light are not focused upon the retina but in front of it, in consequence of which there is no distinct vision for distant objects. This depends upon the excessive length of the eyeball, and such eyes are considered unhealthy, especially if the degree of shortsightedness is considerable.

To the oculist who is familiar with such cases, myopia indicates something more than the mere fact that only near objects are seen distinctly. With it are associated the conditions upon which the myopia depends, the anatomical and pathological changes which usually accompany it, and which predispose to a dangerous increase of the myopia itself. If the refractive error were the only trouble in shortsight, if there were no liability to its increase, and if there were no diseased conditions of the coats of the eye-ball, then might we consider myopia of slight importance.

Myopia may be either inherited or acquired, and the causes may be classed as predisposing and exciting. Very few, if any, children are near-sighted at birth, but there can be no doubt that a predisposition to short-sight is, in many instances, inherited. That certain physical conditions of the visual organs, and certain tendencies to disease of these organs are inherited, are facts well known to every oculist, for examples of this are met every day. The elongated eye-ball is no exception to this, for we frequently observe a marked tendency to near-sightedness in children born of near-sighted parents. Donders says that nowhere in Europe did he see relatively so many short-sighted people as in Germany, and in that country nearsightedness prevails among children to an extent not known in any other. Even the German children in this country exhibit the same tendency to myopia. Dr. Loring, in examining school-children in New York, found in the same schools and under the same circumstances that 24 per cent of the German pupils were myopic, while amongst the Americans there were 19 per cent, and amongst the Irish pupils only 14 per cent. But, while inheritance is, in some cases, a predisposing cause, other agencies play the more important role of exciting causes, and to those we will now turn our attention.

Chief among the exciting causes are close application to study at an early age while the tissues are lax and infirm, bad and insufficient light, tension of the eyes for near objects, prolonged use of the eyes without rest, congestion of the head, face and eyes from the stooping position, from tight clothing, or from cold feet, badly-printed books, the use of pale ink in writing, bad ventilation of school and living rooms, want of sufficient exercise in the open air, residence in large cities, and other influences which have a debilitating effect upon the system in general.

To me it would seem that modern school-life, especially in our large cities, furnishes most, if not all, of these causes; and we might correctly say that, improperly constructed and insufficiently and poorly lighted school buildings, too young attendance at school, and an imperfect system of education are the principal causes of myopia, both in this country and in Europe. In order to show more clearly the influence which modern school life exerts in the production of myopia, I shall introduce some statistics prepared by many able investigators both in this country and abroad. Dr. Cohn, of Breslau, Germany, examined more than 10,000 school children and students of different ages. In the village schools he found the percentage of myopic pupils to be only 1.4, while in the city schools among children of the same age, he found that more than ten per cent. were myopic, and in the highest grade of the city schools the myopia had increased to the enormous rate of more than 63 per cent. The ratio for the respective years of school life was as follows:—

	Per Cent.		Per Cent.
First half-year	0.4	Seventh and eighth years	11.3
Second half-year and second year,	4.8	Ninth and tenth years	24.1
Third and fourth years	8.6	Eleventh and twelfth years	49.5
Fifth and sixth years	7.9	Thirteenth and fourteenth years	63.3

In the schools of Kœnigsberg, 3,036 children were examined by Dr. Conrad, who found that myopia gradually increased from the lowest class to the highest. The lowest class he designates as the eighth, and the highest as the first class. The per cent. of short-sighted pupils in the different classes was as follows:

	Per Cent.		Per Cent.
Eighth class (lowest)	11.1	Fourth class	28.44
Seventh class	15.8	Third class	44.39
Sixth class	20.5	Second class	54.59
Fifth class	21.8	First class	62.1

In the schools of St. Petersburg, Dr. Erisman examined 4,358 pupils, ranging from eight to twenty years of age. These were from six grades or classes, and the per cent. of myopic pupils in each class was noted as follows:

	Per Cent.		Per Cent.
Preparatory class	13.6	Third class	30.7
First class	15.8	Fourth class	38.4
Second class	22.4	Fifth class	41.3

While the number of near-sighted pupils in the lowest class was remarkably large, and while more than one in eight of these children were handicapped at the very threshhold of school-life with a diseased condition of their eyes, a condition always made worse by close application to study, yet in the highest grade the per cent. of myopic pupils was not nearly so great as was found by Cohn and Conrad in similar classes in Germany. The more rapid increase of near-sightedness in the schools of Germany than in the schools of St. Petersburg is a point worthy of consideration, and I regret that I have been unable to learn what causes gave rise to this difference in the ratio of its increase.

Three years ago Pflüger examined the school children of Lucerne, and according to his published reports the per cent. of near-sighted pupils was as follows:

	Per Cent.		Per Cent.
At seven years	0.0	Fifteenth year	26.0
Eighth year	2.0	Sixteenth year	30.0
Ninth year	3.0	Seventeenth year	43.0
Tenth year	6.0	Eighteenth year	55.0
Eleventh year	6.5	Nineteenth year	56.0
Twelfth year	6.0	Twentieth year	40.0
Thirteenth year	10.0	Twenty-first year	61.5
Fourteenth year	14.5		

These statistics are remarkable in that they show, with a single exception, a steady increase in the number of myopic pupils from the end of the first year at school, when no myopia was found, till the fourteenth year of school-life, when more than six out of every ten were near-sighted.

In the gymnasia of Vienna, Reuss observed that the number of near-sighted students nearly doubled in eight years. The per cent. in each of the eight classes was:

	Per Cent.
First class	33.4
Second class	39.4
Third class	47.0
Fourth class	48.2
Fifth class	43.5
Sixth class	47.7
Seventh class	61.4
Eighth class	59.6

The apparent diminution in the per cent. of myopic students in the fifth, sixth, and eighth years should not mislead us, for none of the students were cured of their myopia, and it is more than probable that many students were obliged to abandon their studies in consequence of their myopia having reached a high degree. Dr. Reuss observed that the degree of myopia had materially increased in a majority of the cases in the space of three years.

The New York Medical Record of January 20, 1877, contains some remarks made by Professor C. R. Agnew, before the "Medico-Legal Society" of New York, regarding examinations for myopia, which had been instituted at his request in Cincinnati, Brooklyn, and New York city. These examinations were made by Drs. Ayers and Williams in the public schools of Cincinnati, by Drs. Prout and Matthewson at the Polytechnic in Brooklyn, and by Dr. Cheatham at the New York College. The following results were obtained:—

	Per Cent.
Public Schools of Cincinnati.	
District school	10.0
Intermediate school	14.0
High school	16.0
Brooklyn Polytechnic.	
Academic department	10.0
Collegiate department	28.0
New York College.	
Preparatory department	29.0
Freshman class	40.0
Sophomore class	35.0
Junior class	53.0
Senior class	37.0

Drs. Loring and Derby made careful examination of the pupils in the schools of New York city with a view of ascertaining the condition of refraction. Of the 2,265 cases examined they found that 3.5 per cent of the youngest pupils were myopic. These ranged from 6–7 years of age. Among the older pupils, those of 20 to 21 years, the per cent. of near-sightedness had risen to 26.78,—nearly eight fold.

This ratio of increase of myopia is equaled only by that observed in the schools of Breslau by Cohn, and by Pflüger in the schools of Lucerne.

My own investigations upon the subject of myopia among school-children includes the examination of about five hundred pupils. Over four hundred of these were in attendance at the Detroit high-school, where the course of studies is very thorough, and the others included both divisions of the lowest grade in one of the district schools. In the first division of the lowest grade were pupils who had been in attendance at school nearly four months, and who ranged from 6 to 7 years of age. In the second division were pupils who had about completed the first year at school, and whose ages ranged from 7 to 8 years. No myopia was found among the pupils of this grade. I regret that circumstances did not permit me to examine the pupils of the other grades in this school.

Of the pupils examined in the high-school the per cent. of myopia in each class was,—

	Per Cent.		Per Cent.
Ninth grade	9.0	Eleventh grade	10.0
Tenth grade	10.0	Twelfth grade	12.0

These examinations would tend to show that myopia does not prevail to a great extent among the pupils in the schools of Detroit, and that it increases from none in the lowest grade to 12 per cent in the highest during the twelve years' course of studies, that is, at the ratio of one per cent. yearly.

While this is a very favorable showing when compared with the statistics of other American cities, and while it is remarkably so when compared with the condition in the schools of Germany, yet it behooves us to use every precaution lest matters grow worse, which they certainly will as our city becomes more of a metropolis, unless we correct several existing defects in our school-buildings and in the manner in which the school-rooms are lighted. But of this I shall speak later.

From what has already been said, and from the data which have been furnished, it might naturally be inferred that myopia was peculiar to cultivated nations. That it *is* peculiar to cultivated nations is true, although the extent to which it prevails amongst a people cannot be taken as an index of their intellectuality.

Myopia does not prevail to a great extent in England, yet no one will maintain that the English are not a cultivated people, or that England has not produced her full quota of ripe scholars, fine poets, able dramatists, and men eminent in every department of art, literature, and science, men who have few equals and no superiors. On the other hand, we see that myopia is seldom met with in the rude uncultivated peoples of other countries. For example, Dr. Macnamara, formerly professor in the Calcutta Medical College, states that myopia is almost unknown among the lower classes of India. He informs us that a few years ago he availed himself of every opportunity to examine the eyes of the Southals, the aborigines of Bengal, but never met with a case of near-sightedness amongst them. "In fact," says Dr. Macnamara, "whole races appear to be actually strangers to this disease."

Dr. Callan examined several hundred colored children in the schools of New York, and found that only 3 per cent. of the pupils were myopic; and from the investigations of other observers it would appear that myopia is seldom met with among negroes. How then, shall we account for these apparent contradictions? that myopia is the result of close study, education, etc., that it is not found among the people of uncultivated countries, and that in cultivated England it prevails only to a slight extent. In regard to the infrequency of near-sightedness among the English, I think it susceptible of the following explanation: The English are fond of out-door sports, such as boating, foot-ball, cricket, and the like; and these healthful exercises, by keeping up the physical tone and vigor of the system, help to counteract the ill effect of school-life. Then, their books are well printed in good ink and with excellent type, matters of great importance.

We have, however, stronger arguments than mere statistics to show that myopia may be really and directly produced by close application to study when proper precaution is not taken to prevent its ill effects. Fortunately the observations of Erisman have furnished us with some important data upon this point. He noted that pupils in the same schools and under the same influences, who studied most, were most affected with near-sightedness. Of the 4,358 pupils examined by him, all studied two hours out of school, some studied four hours, some six, and others more than six hours. Of those who studied two hours, 17 per cent. were myopic; of those who studied four hours, 29 per cent.; and of those who studied six hours or over, more than 40 per cent. were myopic. How, then, do long hours of study, poor light, and other bad influences bring about this elongated condition of the eye-ball upon which the near-sightedness depends? During close application to study the eyes receive a greater supply of blood, and if this close application is long-continued the fluid contents of the eye become somewhat increased, the coats of the eye become congested, and a slight increase in the tension of the ball is apt to occur. To this is added the pressure of the muscles which converge the visual axes, and also the tension of the ciliary muscle, circumstances which of necessity accompany every effort to see near objects. Now if this is continued day after day, week after week, and year after year, before the tissues of which the eye-ball is composed have become sufficiently firm to resist these influences, a stretching and a thinning of the tunics of the eye and a consequent elongation of the ball occur. On account of the attachment of the muscles which move the eye, and on account of the relation of these muscles to the ball, the posterior part of the eye presents the point of least resistance, and when the stretching, bulging and elongation of the eye occur, it is always at the posterior pole. The nearer the object is brought to the eye the greater will be the strain of the ocular muscles, and the greater will be the pressure of some of these muscles upon the eye-ball, and the greater the tendency to its stretching and elongation. Now, if the light is deficient, or if it comes from such a direction that the shadow of the pupil's body falls upon the book or paper, he invariably brings it near that the eye may receive more light, as was explained in a preceding paragraph. Under such circumstances the pupil usually bends over, and as the stooping position prevents a free return of the blood from the head, face, and eyes, it favors the congestion of the eye already referred to. This congestion, often repeated and long continued, finally leads to certain pathological changes in the tunics of the eye, and as a result the myopia becomes progressive. These changes once begun tend to increase, particularly during youth and adolescence; and in rare instances they terminate in detachment of the retina from the choroid and total blindness of the victim. Donders, who is high authority, in speaking on this subject, says: "Not only is the near-sighted individual not in a condition to discharge all civil duties, not only is he limited in the choice of his position in society; but in the higher degrees, nearsightedness leads to disturbance of the powers of vision and threatens its subject with incurable blindness."

Now, what can be done to correct the ill effect which school-life exerts upon the visual organs? From what I have observed in our own city, where we are free from many of the injurious influences of larger places, where our schools will compare favorably with any in the land, and where the proportion of near-sighted pupils is comparatively small, I am convinced that much can be done and that many existing defects need correction. I will now call your attention for a moment to some things which I observed in the manner of lighting our schools, and to other defects which should be remedied. In most instances I observed that the light was insufficient. In some cases a portion of the light came from the back, and fell directly in the face of the teacher, and the shadow of the pupil's body covered the book or paper. In a few instances a portion of the light came from the front, and was a source of annoyance, as well as of injury, to the pupil. In some very wide rooms light came from only one side, or from one side and from the rear, in consequence of which pupils seated farthest from the windows did not receive a sufficient amount of light. In every room which I entered, blackboards were placed between the windows, and in order to see these boards, the pupils were obliged to put themselves in a strained, uncomfortable position, while the light from the windows on either side of the blackboard came directly into the eyes. In most cases the lintels of the windows were too far from the ceiling, in some instances being about five feet below. In numerous instances the windows were too near the floor, and the light which fell below the desk was mostly lost.

The surface of window space rarely exceeded ten per cent of the floor surface, while in many instances it was not greater than six per cent, and in some cases it was even less than six per cent.

With two or three exceptions, the methods of ventilation were not the most approved, and in many instances the windows seemed to be the only means through which any ventilation could be secured.

I shall now attempt to answer the question, "What can be done to correct the ill effect which school-life exerts upon the visual organs?" In regard to light in the school-rooms, it should come from a proper direction, it should be abundant in quantity, and it should be pretty equally distributed to all parts of the room. Most of those who have given much thought and attention to the subject advocate the plan of lighting the room from the left side only, giving as a reason, that in writing, etc., the shadow of the hand does not fall upon the book, slate, or paper. This plan may seem correct in theory, but in practice you will find, as I did, that in wide rooms the pupils at the extreme right receive an insufficient amount of light. Javal, in a paper recently read before the Société de Biologie, advocated lighting the room from both sides, and my own observations convince me that this is the correct plan. According to Javal, the most recent investigations show that the per cent. of myopic pupils is much less in schools where the light is bilateral than where it is unilateral. He maintains that sufficient light from windows arranged upon one side of a room can only be obtained when the width of the room does not exceed the height of the windows. This is one extreme, and it is my opinion that a room whose width was equal to twice the height of the windows would be another extreme, and that between these limits we may secure good and sufficient light. Light coming from the rear is objectionable for two reasons: first, the shadow of the pupil falls upon his book or paper, and in this way much of the light is lost; and second, because the light from such a direction will usually fall upon the face of the teacher. Light from the front is the most objectionable, because the glare will prove irritating to the eyes of the pupil, and in order to avoid this irritation, he will bend the head downward, and, as was previously explained, the stooping position is decidedly a bad one. Light from above has certain objections, because the pupils who sit in front have a portion of it shut out by the shadow of their bodies, while the light falls more or less in the face of other pupils who sit at the rear end of the room.

As to the amount of light which should be admitted, all agree that it should be abundant without producing any glare. The area of window surface is what is generally taken as the basis of calculation, but that is not a correct index of the amount of light under all circumstances. Those most familiar with the subject hold that the surface of window should be equal to 30 or 50 per cent. of the surface of the floor. My own opinion is that much will depend upon the surroundings. In schools situated on broad streets, with no other high buildings in the immediate vicinity, and in a pure atmoshphere,—conditions prevailing very generally in Detroit,—a window surface equal to 30 per cent. of the surface of the floor of the room will usually be sufficient. In a smoky, foggy atmosphere, where high buildings are nearer than a distance equal to twice their hight, or where the school-building is located in narrow, dingy streets, the window space should be greater than 30 per cent. of the surface of the floor.

The school-rooms should be oblong; the windows should be high, they should come close to the ceilings, and should be square at the top, for the most important part of the light comes from the top of the window. If shades are necessary to shut out a portion of the glaring light, they should be so arranged that they can be rolled from the bottom rather than from the top.

Javal favors placing the windows on the east side of the building, with the long axis of the building nearly north and south. This plan affords the advantage of the soft, mellow light of the eastern sky, and sufficient sunshine with its healthful influence, while the sun at mid-day does not shine directly into the room. Many prefer the diffuse light of the northern sky, which has no irritating effects upon the eye, and which is so pleasing to the artist; but unless the window surface is quite large, all parts of the room will not be sufficiently lighted, and the healthful influences of sunlight are lost.

Schools should be situated on spacious lots, and should be separate from all other buildings a distance equal to twice the hight of the highest building in the vicinity. The walls of the school-room should not be a glazed white, for the light reflected from such a wall is likely to irritate the eye; and neither should they be very dark, for in such case too much of the light is absorbed. A faint neutral tint will be most grateful to the eye, particularly the greenish or the gray tint.

On account of the effect of impure air upon the eyes, if for no other reason, the school-room should be thoroughly ventilated; for an impure atmosphere, in addition to its irritating effect upon the visual organs, induces a feeble condition of the system and a laxity of tissue, and in this way acts as an indirect cause of myopia.

What has been said in regard to light, ventilation, etc., in the schools, applies with equal, if not greater, force to the homes of the pupils, for there can be no doubt that to the school-room is often laid the blame for injuries done at home. Erisman found that the greater the number of hours spent in study out of school, the greater was the per cent. of myopia.

Since myopia, which is the worst result of long hours of study, generally occurs before the age of twenty, and since comparatively few cases have their origin after the eighteenth year, the necessity for shortening the hours of study in early school life is apparent. After the eighteenth year the tissues are more firm and unyielding, and the tunics of the eye are better able to resist the injurious influences of close application to study.

The type, ink, and paper which are used in books are matters of great importance. In most American books an inferior quality of ink is used, and the letters are not as clear as those found in most English publications. The size of the type should not be less than one-sixteenth of an inch, or about the size of long primer. A faintly tinted yellow paper will be more agreeable to the eye than a glazed white, for the latter reflects so many rays of light that it is apt to prove irritating to the retina. Pale writing ink should never be used.

Another point to which I must call your attention, is the fitting of spectacles for young children who are daily engaged in close study. Few people are aware that the spectacle-vender is wholly incompetent to correctly perform such a duty. Spectacles should never be fitted for children except by persons throughly competent, and particularly is this so in cases of myopia; for if an improper glass is given the near-sightedness may be increased, and serious injury may be done the eye, as I have seen in more than one instance.

In conclusion, I would add, by way of recapitulation, that if we would prevent, to a very great extent, the ill effect which school-life and close application to study exert upon the visual organs, the following rules should be observed:

1. Lessen the hours of study and shorten the sessions of study for pupils under fifteen years of age.
2. Provide an abundance of light, from the left side if the room is quite narrow, from both sides if the room is wide, but do not allow the sunlight to fall directly on the book or paper.
3. Ventilate the school-rooms thoroughly and in accordance with the most approved methods.
4. The pupil should sit erect, and should hold the book at least twelve inches distant.
5. Pupils should avoid whatever causes a congestion of the head, face, and eyes, such as tight clothing, cold feet, the stooping position, etc.
6. Pupils should not study during recovery from illness, or when suffering great bodily fatigue.
7. Text-books and readers should be printed in good ink and with a clear bold type, about the size of long primer, a little larger than one-sixteenth of an inch.
8. Pupils should avoid everything which has a debilitating effect upon the general system.
9. Exercise in the open air should be taken freely, and every precaution should be used to keep up the bodily vigor, something which is too often neglected. An education is dearly purchased whose price is a shattered constitution and a ruined eyesight.

DISCUSSION.

Superintendent J. M. B. Sill, of the Detroit public schools, said the paper was of great interest to him. He asked what schools Dr. Lundy carried his investigations on in.

Dr. Lundy replied that he had visited the high-school and the Washington, Duffield, Clinton, Everett, Houghton, Tappan, Webster, and Cass schools.

Superintendent Sill asked several other questions, among which one was if the light reflected from a white wall on the books of the pupils was injurious.

Dr. Lundy replied that the light reflected directly from a white wall to the eye was injurious, but that reflected first to the book, so far as that phase of it was concerned, was not necessarily so.

Dr. Eugene Smith, of Detroit, said he heartily indorsed the paper of Dr. Lundy. He was sorry he had not called attention more particularly to the outrage practiced when blackboards were put between windows. He thought teachers should test the vision of their scholars in a rough way at least, and seat those who had weak or myopic eyes in the most favorable light. Dr. Smith also made several valuable suggestions concerning height of desks, etc. He said much injury was done every year by unscientific fitting of spectacles.

Dr. Kedzie asked concerning the effect of studying out of school, and by lamplight.

Dr. Lundy replied that it was injurious and a fruitful source of myopia.

A vote of thanks was tendered Dr. Lundy.

President Brodie said he saw ex-governor Bagley in the room, and as he was the governor in whose term the State Board of Health was organized, he knew the convention would be happy to hear from him.

Governor Bagley said he had come to learn and not to speak. He congratulated them upon the success of this the first effort in behalf of public health in the State in a public way. If continued, this movement would no doubt do a great deal of good. As he got older it seemed to him more and more that 90 per cent of the world wanted the other 10 per cent to think and act for them, actually would die anyhow, and would not be born anyhow, if there was not some one to help them. And he did not know but some people thought their neighbors, in addition to keeping them alive and happy, thought they ought to provide for them in the future. The men who thought for others, on subjects of public health and welfare, were the saints and apostles of the 19th century. He was proud of the example which had been set in this State in this matter. He hoped they would by-and-by increase the lives of Michigan people to at least 100 years, and give them a good future after that.

Dr. H. F. Lyster, of Detroit, then read the following paper on the Prevention of Pulmonary Consumption:

THE PREVENTION OF PULMONARY CONSUMPTION.

BY PROF. HENRY F. LYSTER, M. D., OF DETROIT.

It will hardly be expected that in a paper presented at this convention, the various theories entertained regarding the pathology of this disease will be entered into at any length, or that the minute anatomy or finer subdivisions will be discussed. We will then accept the fact simply that pulmonary consumption is a disease characterized by wasting of the body, accompanied by a cough and expectoration, and in a large proportion of cases progressing to a fatal termination, an examination after death showing evidences in the lungs of changes resulting from inflammatory processes. In a convention of the character of this one, can there be any subject presented for discussion of greater interest than the prevention or limitation of that disease which, by its almost universal prevalence, results in an estimated mortality of from ten to thirty per cent of the deaths from all causes?

With the large mortality due to this disease, and in which the symptoms have been manifestly apparent, there are many cases of continued illness in which the scrofulous cachexia or constitution becomes an important factor in preventing the normal restoration. This is observed in lessening the vitality and diminishing the longevity of the individual, thus opening a Pandora's box of evils against which we may well invoke the aid of the sanitarian.

Consumption presents itself to us in such a variety of shapes and concealed beneath such effective disguises that in many instances we are for a time completely deceived and only awakened too late to be able to disarm the relentless foe, who has made his way unchallenged into the inmost courts of the citadel of life. We find it associated with the brilliant intellect of the precocious boy, with the active development of brain and nerve, lighting the fire in his eye and the flush upon his cheek, while chiseling away insidiously the full round limbs until at last the hand stretched out to receive the laurel crown from his competitors in the intellectual race is too weak to place it upon his brow, and before the leaves have faded in the wreath he has been numbered among the great multitude of those who have fallen before their sun had reached the zenith of their day.

How frequently do we find the tendency to this disease betrayed by that dash of struma which gives to woman a type of beauty little less than angelic. Are there not written upon the memories and engraved upon the hearts of many of us the image, pure and chaste, of her who long years ago faded away like a flower? The liquid eyes, the long eye-lashes, the pencilled brows, the fine hair, and the delicately fair skin, the flush upon the cheek, too brilliant to have been painted by the health-giving pencil of the sun, the chiselled features, and semi-transparent hands, all have been parts of the earthly tabernacle of a mind characterized by such spiritual graces that its separation from the frail tenement came with that gentleness which marks the earliest rays of the morning as they penetrate the lingering shadows of the night, and leaves us only the memory of what has been. Among children with these tendencies, however strong and vigorous they may seem to the uneducated eye, here and there are lurking the traces of the approach of this insidious disease, inherited, it may be, from one or both parents, or engrafted in early years by some conditions of the home unfavorable to health, or by some disease of infancy which was not followed by a perfect and complete restoration to health. How often do children between two and seven succumb to its influence. Whooping-cough and measles are particularly prone to start into activity any latent scrofulous tendency, and are frequently the proximate causes of tubercular meningitis, or tubercular pleuritis. Irritation of the digestive system during teething, where this tendency is present, often produces that enlargement of the mesenteric glands which subsequently becomes the seat of tubercular deposits. Between the ages of seven and sixteen there seems to be a certain amount of exemption even among those who have inherited strong constitutional tendencies toward this complaint. This comparative exemption is supposed to be on account of the freedom with which the blood is formed during this period of youth. Between twenty and thirty-five is a second period when the constitutional or acquired tendencies are strongly manifested, and it is during this fifteen years that so many die. Observers of and writers upon this disease have varied greatly in their opinions regarding the influence of age upon the mortality from pulmonary consumption. A prevalent opinion has been that it was confined to youth, and that those who had reached the age of thirty-five without manifesting any symptoms of this disease, would in all probability never fall victims to this malady. In noting these observations regarding the comparative frequency with which consumption is met with in youth, it must be remembered that there are a great many more young than old people in the world. For instance, there are nearly three times as many persons living between 20 and 30 years as between 50 and 60 years. Consequently we would meet three times as many cases between 20 and 30 as in the latter decades, provided there was an equal prevalence of the disease at both periods. According to the U. S. Census reports for 1870, the proportion of deaths from consumption was about 25 per cent for the whole population. Niemeyer states that "from one-seventh to one-fifth of all deaths are the result of this disease, and in nearly one-half of all cadavers we find traces of nutritive disorders from which pulmonary consumption proceeds."

From the mortality reports of New York City, which are the most accurate of any in this country, more than one-half the deaths are those of young children, among whom pulmonary consumption is not frequent, although they suffer largely from various forms of tuberculosis; nearly one-third of the deaths among the adult male population is caused by consumption. From these reports 29.38 to 100 deaths from all causes among the whole population, 73 deaths to 10,000 living adults annually result from pulmonary consumption. The mortality of the Mutual Life Insurance Company of New York, shows 19.74 to 100 deaths from all causes among selected lives for adult males—or 19 deaths annually from consumption to 10,000 living members.

The experience of this company, the largest life insurance company in the world, with nearly if not quite 100,000 members selected with great care shows a large number of deaths from consumption after middle life. From the reports of this company we are enabled to present the facts showing the per cent. of deaths from consumption at different ages. While statistics of the last U. S. Census are not satisfactory for the reason that age and sex are not stated, therefore relative statistics cannot be obtained for comparison of different localities and seasons. The census of 1880 will be conducted in a manner which will afford us much more reliable information in this respect.

Deaths from Consumption in 10,000 Living Adult Males.

AGES.	U. S.	N. Y. City.	Mutual Life Ins. Co.	AGES.	U. S.	N. Y. City.	Mutual Life Ins. Co.
20 to 29	23	70	24	60 to 69	46	110	--------
30 to 39	27	71	20	70 to 79	71	151	30
40 to 49	27	66	17	80 to 89	111	--------	--------
50 to 59	31	84	14				

Deaths from Consumption, Adult Males, England, 10,000 Selected Lives.—(Oesterlen.)

AGES.		AGES.	
15 to 25	33	55 to 65	37
25 to 35	41	65 to 75	27
35 to 45	40	75 to 85	11
45 to 55	39		

Deaths from Consumption, Adult Males, 10,000 Insured Males.

AGES.	Mutual Life.	United German Experience, 12 German Cos.	AGES.	Mutual Life.	United German Experience, 12 German Cos.
21 to 25	23	19	46 to 50	16	38
26 to 30	23	39	51 to 55	15	35
31 to 35	22	42	56 to 60	16	32
36 to 40	17	37	61 and upwards	18	32
41 to 45	17	30			
			All Ages	18.6	35.7

These tables show the general prevalence of consumption at all ages, and that there is no special prevalence of the disease in youth.

Professor Rheule, of Bonn, giving the German experience of age states that "it is observed only after the first dentition, and the mortality from this cause during childhood reaches a maximum between 4 and 7 years. The actual maximum occurs between 15 and 25 years, the mortality then remains high until 35 years and after this time steadily decreases. The most common causes of consumption among children, besides a strong predisposition, are scrofula, lingering effects of measles or whooping-cough, unfavorable vital conditions, bad air, insufficient nourishment; at a later period other causes come into existence, as formation of chest, employment, anæmia, abuse of alcoholic stimulants, etc., etc.'

The report of the Provost-Marshal-General's Bureau of Statistics of the War of the Rebellion, gives relations of pulmonary consumption to age, occupation, locality, etc. From it the following statements have been abstracted:

PHTHISIS PULMONALIS (PULMONARY CONSUMPTION) AND CHRONIC DISEASE OF LUNG *in relation to Age,—results of examination of 334,321 recruits, substitutes, drafted, and enrolled men of various nativities.—(From Statistics, Medical and Anthropological, of the Provost-Marshal-General's Bureau, Washington, 1875, Vol. II., pages 461, 463.*

AGES.	Number Examined.	NUMBER REJECTED.			RATIO, PER 1,000, REJECTED.		
		Phthisis Pulmonalis.	Chronic Disease of Lung.	Both.	Phthisis Pulmonalis.	Chronic Disease of Lung.	Both.
TOTAL	334,321	3,724	2,444	6,168	11.139	7.310	18.449
Under 20	58,952	119	105	224	2.019	1.781	3.800
20 and under 25	78,639	614	429	1,043	7.808	5.455	13.263
25 and under 30	56,711	735	445	1,180	12.960	7.847	20.807
30 and under 35	45,777	729	438	1,167	15.925	9.568	25.493
35 and under 40	50,456	856	538	1,394	16.965	10.663	27.628
40 and over	43,786	671	489	1,160	15.325	11.168	26.493

PHTHISIS PULMONALIS (PULMONARY CONSUMPTION) *in its relation to Occupation,—Showing the Number examined, and the ratio rejected per 1,000 examined.—(From same Report, Vol. I., Chart XXVII.)*

	OCCUPATIONS.	Number Examined.	Ratio Rejected.		PROFESSIONS.	Number Examined.	Ratio Rejected.
	All Occupations	334,321	18.449	4	Public Officers	633	61.611
				5	Physicians	1,235	60.729
1	Professions	7,576	45.539	6	Teachers	1,625	47.385
2	Mercantile	18,818	37.836	7	Clergymen	712	46.348
3	Skilled	75,761	22.096	8	Lawyers	732	42.350
4	Unskilled	232,166	14.718	9	Druggists	622	40.193
				10	Students	1,062	22.599
	PROFESSIONS:—			11	Musicians	415	12.049
1	Editors	73	82.192				
2	Dentists	215	65.116				
3	Architects	252	63.492				

PHTHISIS PULMONALIS (PULMONARY CONSUMPTION) *in its relation to Locality, and to Physico-Geographical Divisions, showing the Number of Drafted Men examined and the ratio rejected per 1,000 examined. (From same Report, Vol. I., Chart XXXVII.)*

	STATES AND DIVISIONS.	Number Examined.	Ratio Rejected.
	All States	501,002	20.513
	Eastern	89,185	27.157
	Middle	254,649	22.991
	Western	157,168	12.778
	Sea Shore	121,271	27.319
	Inland	278,894	19.455
	Lake Shore	63,442	16.551
	Mississippi	37,395	13.050
1	Maine	20,479	32.228
2	New York	95,576	30.112
3	Connecticut	11,017	28.683
4	Maryland	16,920	28.546
5	Massachusetts	36,380	26.800
6	Vermont	7,224	25.885
7	Rhode Island	4,072	25.786
8	Missouri	8,576	25.420
9	Pennsylvania	112,686	19.479
10	New Hampshire	10,013	17.877
11	Ohio	37,700	14.403
12	Delaware	6,361	14.149
13	Indiana	29,279	13.354
14	Kentucky	16,028	12.728
15	Dist. of Columbia	6,954	11.648
16	Illinois	18,126	11.420
17	Minnesota	6,489	11.250
18	Iowa	6,846	10.371
19	Michigan	12,179	9.606
20	Wisconsin	21,945	8.795
21	New Jersey	15,388	7.148
22	West Virginia	764	1.309

The weight of medical opinion founded upon intelligent observation inclines to confirm a belief in the contagiousness of phthisis. There are few practitioners of long experience who cannot recall cases coming under their own observation where the disease was induced, so far as could be determined, by contagion from long and intimate association between a consumptive and a person previously free from any form of this disease. Dr. Parkes in his work on Practical Hygiene says: "Considering that the pleuro-pneumonia of cattle is probably propagated through the pus and epithelial cells of the sputa passing into the air-cells of other cattle, that even in man there is some evidence of pneumonic phthisical disease being contagious, the floating of these cells in the air is worthy of all attention. It may explain some of those curious instances of phthisis being apparently communicated." Dr. Jules, of the French Academy of Medicine, in a recent discussion, states that "while believing that crude tubercle can never be contagious, yet when it is softened, and the ulcerated lung surfaces are exposed to the air, the patient may become a source of infection to those about him." Dr. Richardson, of London, mentions a case in his own practice where a tinker who moved about the country drawing a covered cart, in which he slept at night, after an illness of several years died of phthisis, and that seven subsequent owners living under similar conditions all died of the same disease, evidently receiving the infecting material from the closely covered wooden kennel.

Within my own knowledge, a case occurred where a patient, coming of a stock none of whom have since died of consumption, whose father died of acute apoplexy at 60; the mother, at the advanced age of 80; a sister, of diphtheria at 47; another sister, at 66 of rheumatic gout; and two of whose brothers are still living at advanced years in good health,—this lady died of acute phthisis within two years after the death of her husband of consumption, the latter having been ill for some years and requiring her constant presence, in times when the fresh air was invariably listed out. In this case the exclusion of any probable cause having been readily made, and fortified by many years' observation of the family, the inference is very direct that she contracted the disease owing to her close attendance on her husband.

Rindfleisch says: "The experiments of innoculation of lower animals with tubercle was chiefly to demonstrate the infectious nature of tuberculosis, and the existence of a tuberculous virus, which like syphilis could be transmitted from one person to another. Such an idea I am far from rejecting; on the contrary, I shall have frequent occasion to refer to it when I speak of the histology of tubercle."

"Tuberculosis in man depends upon scrofula, concerning the nature of which we are still very ignorant; one fundamental ingredient of the disease seems to be a disproportion between the volume of the blood and the weight of the body; with this condition exists an abnormality of the entire vital action, which is especially evident in the course of any inflammatory processes which may arise. Scrofula may be the result of bad food, damp climate, or at least damp dwellings, of exhausting losses of blood, and vitality, and is eminently hereditary. It is almost an exception to find a child of scrofulous parents without some trait of this disease. The great danger of scrofula lies in the possibility of the supervention of tuberculosis. Hereditary scrofula usually makes itself manifest at two periods of life, in early childhood, before 7 years of age, and again between 20 and 30. The other years of life are by no means exempt from the disease, but it is important to remember that between the ages of 10 and 15 years there is a period of comparative immunity."

The question of nativity as regards consumption has been studied by the superintendent of the U. S. Census, and it has been found that the longevity of those born in the United States is greater than that of emigrants; yet in regard to consumption the mortality among the native-born from this cause is slightly above the average of those coming to us, with the exception of the Irish. The mortality of the Irish from this cause is greater than that of any other people coming to our shores. The mortality tables of the Mutual Life Insurance Company and of the New York City Board of Health substantiate this fact. This may be in part if not wholly accounted for by remembering that upon their arrival in this country they are, generally speaking, the most destitute and improvident of our immigrants.

On the other hand, in the report of 501,068 enrolled men in the late war, examined by the officers of the Provost-Marshal-General's Bureau, the following table will show a ratio of rejection for consumption larger for the United States and Germany.

PHTHISIS PULMONALIS (PULMONARY CONSUMPTION) AND CHRONIC DISEASE OF LUNG, *in relation to Nativity,—results of examination of 501,068 recruits, substitutes, drafted and enrolled men.* (*From same Report, Vol. II., pages 431-447.*)

NATIVITY.	Number Examined.	NUMBER REJECTED.			RATIO, PER 1,000, REJECTED.		
		Phthisis Pulmonalis.	Chronic Disease of Lung.	Both.	Phthisis Pulmonalis.	Chronic Disease of Lung.	Both.
All Nativities	501,068	5,044	3,256	8,300	10.067	6.498	16.565
United States (white)	315,620	3,605	2,189	5,794	11.422	6.936	18.358
Ireland	50,537	330	286	616	6.530	5.659	12.189
Germany	54,944	719	442	1,161	13.086	8.045	21.131
England	16,196	87	81	168	5.372	5,001	10.373
Scotland	3,476	19	14	33	5.466	4.028	9.494

PHTHISIS PULMONALIS (PULMONARY CONSUMPTION) AND CHRONIC DISEASE OF LUNG, *in relation to Height,—results of examination of 501,068 recruits, substitutes, drafted and enrolled men, of various nativities.*—(*From same Report, Vol. II., pages 409-425.*)

HEIGHTS.	Number Examined.	NUMBER REJECTED.			RATIO, PER 1,000, REJECTED.		
		Phthisis Pulmonalis.	Chronic Disease of Lung.	Both.	Phthisis Pulmonalis.	Chronic Disease of Lung.	Both.
All Heights	501,068	5,044	3,256	8,300	10.067	6.498	16.565
Under 5 ft. 1 in.	3,747	29	13	42	7.740	3.469	11.209
5 ft. 1 in. and under 5 ft. 3 in.	20,838	132	108	240	6.335	5.183	11.518
5 ft. 3 in. and under 5 ft. 5 in.	71,038	428	372	800	6.025	5.237	11.262
5 ft. 5 in. and under 5 ft. 7 in.	132,087	1,083	789	1,872	8.199	5.973	14.172
5 ft. 7 in. and under 5 ft. 9 in.	144,650	1,534	1,020	2,554	10.605	7.052	17.657
5 ft. 9 in. and under 5 ft. 11 in.	88,792	1,198	627	1,825	13.492	7.061	20.553
5 ft. 11 in. and under 6 ft. 1 in.	32,313	519	264	783	16.062	8.170	24.232
6 ft. 1 in. and over	7,603	121	63	184	15.915	8.286	24.201

What can be done to limit the prevalence of consumption by the application of the rules of sanitary science? We are all aware that much has been done toward the limitation of cholera, small-pox, malarious fevers, typhoid fever, typhus fever, dysentery, and other forms of disease. Aside from the universality of consumption are the important facts of its transmission by inheritance, by contagion, and also its influence in affecting other forms of disease; all these important facts are admitted on every side, and serve to point out the necessity of limiting the disease, if such a thing be at all possible, by any and every means in our power. The study of this subject has shown us that we have a number of very important and reliable means of vastly lessening the amount of pulmonary consumption, some of which will be briefly considered.

First of all, the fact of hereditary transmission; the children of consumptive parents are the great company from which the vast majority of consumptives come. They inherit the seeds of the disease, and only wait the advent of the exciting causes for the germination and full development of the destroyer. These causes are met with on every hand, cold, exposure, privation, overwork, mental or physical, depressing influences of every kind, the ordinary diseases of childhood, lack of proper food, clothing, etc., unfitting occupation or employment. The logical inference is clear,—there should be as a primary step toward the limitation of consumption no intermarriage between, or with consumptives. Could this well known and admitted fact be carried out the most effective means for the limitation of this disease would have been taken. Such a desideratum, however devoutly to be wished, can only be approximately attained, and that by opening the eyes of the people by the general diffusion of knowledge upon the subject. Make it impossible that this great law of nature be infringed by those not aware of its existence (thus making the sin one of commission rather than omission), let the circumstances which determine marriage, affection, interest, propinquity, be tempered with a knowledge of its entailments, and much will be done in the direction of limiting these alliances and their inevitable consequences, scrofula and pulmonary phthisis. The children born to parents of scrofulous diathesis should be wet-nursed in early infancy from birth, by nurses carefully selected with reference to good physical condition. This is very important in the attempt to impart a sound constitution to children already strongly predisposed to struma. Avoidance of the diseases of childhood as much as possible should be insisted upon, especially measles, whooping-cough, and bronchitis, these diseases having a strong tendency to develope tuberculosis. The popular opinion that many of these diseases, particularly small-pox, hardened the constitution and eliminated morbid tendencies such as we have been considering, is most erroneous. The latest theories regarding consumption are those advanced by Saulsbury: 1st. that it is a constitutional blood disease caused by an yeast plant, developing first in the digestive system, then in the blood glands, and finally in the white corpuscles and serum; 2d. the spores of this plant constitute the hereditary taint; tubercles are the secondary product; the disease (it is affirmed) may be detected in the blood in the pre-tubercular state.

Dr. McCormac, of London, has published his views in relation to air re-breathed as a cause of consumption, and believes that tubercle is usually induced by a want of fresh air. Very many cases of consumption undoubtedly arise from this cause, and the desirability of providing the best means of ventilation for dwellings, school-houses, manufactories, and public halls cannot be too urgently insisted upon. In the Medical History of the Rebellion (2d Vol., 1879) Surgeon Woodward reports in regard to phthisis complicating chronic dysentery: "If by phthisis we designate all those chronic processes which result in destruction of lung tissue and cavity formation, it must be admitted that this condition was an exceedingly common and fatal complication of chronic dysentery. The exposure and fatigues of the military service in times of war, together with the impaired nutrition resulting from camp diet, undoubtedly favor the development of tuberculosis in predisposed subjects, and the depressing influences of chronic flux hasten the process of the disease."

The relation between soil-moisture and phthisis has been observed by many searchers after the causes of consumption. Dr. Bowditch, of Boston, is entitled to the great credit of having by a series of exhaustive observations published in 1868, called special attention to this subject, proving that the relationship does exist. The Privy Council of Great Britain, at the suggestion of Dr. Simon, the Registar-General, appointed Dr. Buchanan, of London, to verify these results. Dr. Buchanan's investigations, which embraced the whole of England, and were founded upon an analysis of the sickness and mortality of numerous localities on all kinds of soil in different parts of the kingdom, led to the general conclusion that the amount of consumption is in proportion to the dampness of the soil. The effect of climate upon the human body as defined by sanitarians is the sum of the influences which are connected either with the solar agencies, the soil, the air, or the water of a place; and as these influences are in the highest degree complex it is not at present possible to trace out their effects with any degree of certainty. There are many factors in climate and in its effects upon different races, which are under observation and have not yet been determined. The effect of altitude is one; the influence of ozone, another. Temperature has been definitely proved to have nothing in common with consumption. Localities widely differing in temperature have been found to vary but little in the amount of consumption. Certain localities in all countries have obtained a reputation for exemption from pulmonary disease, also as curative for those invalids coming to them, which upon close analytical examination they have only at best partially maintained.

Official reports of different governments, and registration reports of troops serving in all parts of the world, show that in no country is there complete exemption. In cold countries we are likely to meet the catarrhal and more chronic forms, and in the tropical climates the febrile and more rapid cases. Greenland and Iceland, at one time reported as entirely exempt from consumption, prove upon official examination to suffer from it in no small degree. On the other hand, at Bengal, in India, with its moist and tropical climate, the percentum of mortality in the British army is the same as in Canada. The elevated country of Peru and Chili, where phthisis has been stated to appear only as an exotic, has upon recent investigation been shown to give rise to cases which are sent to the littoral margin of the country, to be near the sea. These cases are comparatively rare, while many cases occur at the coast which are sent with manifest improvement to the Andine valleys of La Paz and Bogota, eight thousand to thirteen thousand feet above the level of the sea. To these favorite resorts are sent many selected cases from Europe.

According to the last census, the per cent of mortality from consumption in Michigan was about the same as that occurring in Northern Indiana, Central Ohio, Southern New York, Eastern Virginia, Maryland, Western Connecticut, Western Massachusetts, and Southern Vermont, namely, 14 to 20 per cent of all deaths. This has been deduced from a comparison of the deaths from consumption to all deaths occurring during a certain number of years. It has been shown by competent authority that this method of comparison does not determine the relative amount of consumption in different States; for such a comparison there should be given the per cent of deaths to the population, by sex and age of decedents, and of inhabitants.* The census of 1880 will probably be more complete in this respect, and consequently more satisfactory. According to the Vital Statistics of Michigan, the per cent of deaths from consumption to deaths from all causes, for the years 1871–8, was as follows:

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*Such a comparison has been made for Michigan, by Dr. Henry B. Baker, and published in the Vital Statistics of Michigan 1870, on page 315 of which volume is a diagram which pictures to the eye a graphic representation of the relations of deaths from consumption to the inhabitants, of each sex and at the different ages.

Ratio, Per Cent, of Deaths from Pulmonary Consumption to Deaths from All Causes in Michigan, in the Years 1871–8.

YEAR.	Per Cent.	YEAR.	Per Cent.
1870	13.47	1875	12.34
1871	13.39	1876	12.64
1872	10.97	1877	12.88
1873	10.15	1878	12.85
1874	11.14		

Many years since the idea that malarial fevers were not only preventive but curative of consumption, obtained a very general credence, and while it was not so fully concurred in by the medical profession in recent years, it was not disproved until the researches of Dr. Bowditch upon the connection of phthisis with damp soils tended to refute the theory of the ague-cure.

With our present knowledge of the effects of climate upon this disease, while much may be done by the medical adviser in directing patients in the earlier stages of pulmonary consumption to climates which might act favorably in retarding or, it may be, in curing the disease, what words of condemnation are too strong, what censure too severe, for the physician who, to relieve himself of responsibility, or desirous of pleasing the patient and his friends, recommends a change of climate, and sends away the poor consumptive in the advanced stages of disease to die among strangers in a strange land?

We find the largest scope for the application of sanitary measures in the limitation of pulmonary consumption. We have considered many of the most important factors in its production: Inheritance, improper or improperly-prepared food, insufficient clothing, deficiency of fresh air, effects of other diseases, over-crowding, injurious occupation, want of exercise, over-work in ill-lighted and ill-ventilated rooms and factories, badly lighted and ventilated schools, dwelling upon undrained soil, exposure to malaria, exposure to too much moisture, exposure to too much dust, and particularly of mineral, animal, and vegetable matter in the trades, and the abuse of alcoholic liquors.

A vote of thanks was tendered Dr. Lyster, after which the convention took a recess till evening.

Third Session, Wednesday evening, January 7, 1880.

The evening session was well attended, and the papers received with marked attention.

The first paper of the evening was entitled

SANITARY REWARDS AND PUNISHMENTS.

BY HON. HENRY W. LORD, OF DETROIT.

Scientifically there are no sanitary rewards and punishments, in the sense in which I may use those terms. I therefore commence this paper by striking out its title.

An oak favorably situated, and year by year rising and spreading upward, availing itself of all accessories to its growth, until it arrives at ideal perfection, under the operation of natural rules of order, cannot be said to be the recipient of sanitary rewards, nor can one adversely placed, making such progress as it may, with obstacles to encounter that stunt or deform its growth and abridge the duration of its life, be said to be the subject of sanitary punishments. The one flourishes in conformity to law with resources available, and the other suffers by alienation from necessary conditions or deprivation of support.

Something like sanitary rewards and punishments, however, result from the observance or violation of sanitary laws; but as rewards and punishments involve of necessity a consciousness of right and wrong on the part of the recipient, as well as discrimination on the part of the power whence rewards and punishments emanate, and as it is maintained in this paper that sanitary penalties are inflicted and sanitary advantages achieved without the least regard to the moral qualities of the conduct that leads to them, the audience will, if it so please, permit me to use the words rewards and punishments in a sense dictated rather by convenience than by technical accuracy.

I shall say little of sanitary rewards. If I shall succeed in sketching a view of sanitary punishments or penalties in such dark shades and deep shadows as will be necessary to delineate the background of the picture; then their contraries, or sanitary rewards, will take their places at their own suggestion and by implication in the foreground, and in such rosy tints as each auditor in his own fancy may envelop his idea of ruddy health, in the full flush of developing powers, progressing to the maximum strength and capacity of our race; even as the morning breaks out of darkness, when

"Night's candles are burnt out, and jocund day
Stands tip-toe on the misty mountain-tops."

When we consider derangement in the natural economy of the human body, we find it bears some analogy to derangement in the order of action that may obstruct the operation of a machine such as man may construct to perform certain evolutions or achieve certain ends. The latter may be treated of as entirely independent of moral qualities.

In the former, that of the human body, disturbance of function or organism may be very much involved with questions of morals; but nature notices the obstruction or disturbance only, and corrects or removes the one or the other, or in default of that, destroys the subject of it without any exception, and without the slightest reference to the moral quality of the action out of which the obstruction or disturbance arises.

If a steam engine with its fire-box and boilers is selected for illustration, it will be found that combustible material of a nature suitable to the purpose and according to the structure must be placed in the furnace in proper quantities, and with a proper degree of continuity. If constructed for wood, coal will not produce what we will here call a healthy action, and would ultimately work destruction. If constructed for coal, wood in such quantities as it could take would not be sufficiently stimulating, and there would be chronic debility with other irregularity.

If fuel of too rapidly combustible nature, as gunpowder and dynamite, were used, the result would be too stimulating, so to speak, and immediate disaster likely to ensue. If the liquids consumed in the boiler were not in accordance with the organism the proper motive power would not be generated; if impure water were used, the surfaces of internal organs would be corroded or the passages walled up with obstructive secretions; or if the fluid be of the best, and it be expanded into steam too rapidly or in excess, damage or destruction would ensue from that source.

If all these things were properly adjusted, then the neglect of piston-rods, cylinders and journals, or the use of unfit materials for lubrication, would result in difficulties analogous to rheumatisms and inflammations, with ultimate decrepitude and dissolution. If, to strain the figure a little, we could for illustration fancy the engine, for the time being, a sentient creature, able to select its own combustibles and other materials, manage its own steam guage, and it were to use coal when constructed for wood, or wood when constructed for coal, or were to fill its furnaces with indigestible, that is to say, with incombustible material, as stone or brick or earth, or if it were to use for steady diet tallow or tar or rosin, or were to swallow powder or dynamite, or permit its steam to rise above the limit of its strength, or were to use liquids that would obstruct or corrode its inner surfaces, then the same damage or destruction would ensue as in the case first supposed, nor would it make the slightest difference in the imposition of these penalties, whether the engine exposed itself to them by accident or design, or through ignorance, or whether any or all these dangers were forced upon it by some agency to which it might have been subject, or which it could not resist.

The law of its organization would only take notice of the fact that its conditions were violated, and the penalty would be inflicted. Nor would the law of its structure take the least notice of the reputable or disreputable character of what the engine might be doing at the time; whether it were forging guns to arm traitors or dressing lumber to build a church would in no way aggravate or palliate its non-observance of the law of its own being, nor render the punishment more or less certain or severe.

The human machinery—I trust you will for the sake of the argument pardon the expression—is, apart from what is generally understood as moral obligation, amenable to a law of its own, a law which, if violated, offers no opportunity for escape. The wrong done may be corrected, though not without loss, and so much of the penalty as shall not have been inflicted may be withheld. It is of no avail to deny the fault, no advocate or attorney can be employed to bewilder the judgment that imposes the penalty, no jury can be selected either on account of its wisdom or its ignorance to agree or disagree concerning it, no witnesses can be bribed or intimidated to misstate the facts, no question of insanity, emotional or otherwise, can be raised. No evidence of general good character will avail, no matter whether the conduct be voluntary or involuntary on the part of the offender, or whether he be engaged at the time in conduct as toward other laws creditable or infamous, if he violate the organic law of his own structure, the act is unlawful and unconstitutional as to himself and his posterity, and the punishment absolutely assured.

In contending for obedience to the law of our organization physically, let me not be understood as holding it paramount to laws which include the regulation of conduct in relation to more enduring interests. The moral law is above the purely physical, but runs concurrently with it so far as the latter reaches, and then goes on with its sanctions into eternity.

There are some well defined borders between the two codes, though in their antecedents and in their consequents they may largely involve each other. If the moral law command, "Thou shalt not kill," the mandate takes notice only of the person who kills, and is indifferent to the person killed. The physical law, on the contrary, is indifferent to the person killing, and only takes notice of the person killed. The moral law is interested in the moral turpitude of the act—the physical only takes knowledge of bones broken, or lacerated tissues that violate its own organic requisitions, and executes final judgment in death.

When the moral law says "Thou shalt not steal," it deals only with the thief, and does not regard the person stolen from. The physical law may or may not take notice of him who has suffered the loss, but if the robbery is such as to cause him to starve then it does, and under its laws he suffers, perhaps dies. If in the first instance, that of killing, the violation of the natural law were by accident or in self-defense, through ignorance or insanity, it would not in the least mitigate the offense or for a moment stay the judgment. On the contrary, if the killing takes place under the latter circumstance, the moral law denominates it justifiable or excusable.

Within the last few days, and while preparing this address, I have read in the newspapers three different accounts of loss of life from small boats on Sunday. The first, a party of irreligious boys on a pleasure-excursion; second, a party of devout young people crossing a little bay to their village church for worship; third, two persons, perhaps physicians, on an errand of mercy or necessity to visit the sick.

There are large numbers of people who will comment only on the first of these occurrences, and it will be regarded as if by special direction of the Great Author of moral obligation; or if the other cases are pondered and remarked upon they will be characterized as mysterious dispensations involving apparent anomalies in God's providence, but only apparent on account of our limited knowledge of his ways.

However involved the conditions as they may appear to us, and numerous as may be supposed the shades or degrees of moral quality in the intents and actions of the different sufferers in the general loss, and without proposing anything whatever from a moral or religious point of view, I may say this as applicable to all of them, that the natural law has to notice but one single circumstance common to the parties, and that is their inextricable submersion in an unnatural element, and consequent inevitable death.

The foregoing involves truisms almost too obvious for statement. The principle implied holds true throughout the following supposed cases, which though supposed are actually true as to facts, and exist more or less open to observation all around us.

In a pleasant and luxurious home, such as some of you know, a case like this may be found: There is a young daughter of the house, a girl to whom you are warmly attached. She is 15 or 16 years old, at that period of maidenhood where, according to Longfellow, the brook and the river meet; affectionate, and the exemplar of all virtues, she is beloved by her father, as was fair Ellen of the Lake by the Douglas when he shed tears upon a duteous daughter's head that would not have stained an angel's cheek. The mother, a woman of feeble constitution, and some weakness by inheritance, died a year or two after the daughter's birth. The young woman is undersized for her age, has little color in her cheeks, and her lips lack freshness and fullness. She is studious, too much so, and devoted to music beyond her strength. Her eyes are wonderfully expressive, and a little convex. She wears glasses that blend so prettily with her features as almost to atone for their necessity. Her intelligence and general information are startling to older persons. She is not only perfect in all her lessons, which extend to several languages, but is a great reader of fiction and current literature, while she also finds time for the standard and classic authors, ranging in stately costume on the shelves of her father's library. She was unlike other children, never cared for recreations, and has lived indoors. Her father was never strong, and his affection for his daughter is intensified by her close resemblance to her mother. He will live quite a number of years, perhaps, to past middle age; she will probably die at

20, or earlier, or if she live much longer there will be an arrest also of intellectual power, and physical and mental failure will take place together.

The moral law will make its record of the case, and so will the sanitary or physical. The parties are unconscious of offense against either. Conscience, the prompter of reproach as to moral delinquency, has suggested no fault. As to the natural law, whatever violation has occurred, at least in the present and preceding generation, has not only been through ignorance, but as was believed by the parties through praiseworthy conduct.

Let us observe another case common, but perhaps less common than the other. A girl a year or two older—her father has disappeared—he had the mark of syphilis inherited and acquired—her mother's constitution was also impaired. The girl was born, we will say, at the Wayne county poor-house, where 20 others similarly circumstanced were born the same year. There were no bonds of wedlock in the girl's family to hold it together. Her mother also died soon after the daughter's birth. She emerged from the alms-house at five or six years old and fell among thieves, grew up under bad influences, and without ever having heard of chastity became unchaste.

The diseases of her class had their taint in her blood when she was born, and they had been reinforced by her manner of life. She, too, was very like *her* mother.

The young woman has lately died in hospital. Sweet sisters of charity, with crucifix pendant at their girdles, waited upon her with soft hands, and in gentle tones invoked for her pardon and comfort in the name of the Blessed Mary, mother of Him who had compassion on such as she.

The moral law has made its record of this case also, and so has the physical; how widely apart in the former, how many pages between; and yet in the latter in their consequences how closely allied the two cases, inasmuch as they, in violation of sanitary laws tended with the same certainty, and in about the same time, to the final penalty of death.

The sanitary law has held its scale with even balance over both processes, indifferent alike to the virtue in the one or the vice in the other. By widely separate approaches, both in their way unlawful and equally fatal, there had been during two or three generations in each family a pathway pointing to and followed steadily down to death.

In the first case, notwithstanding the alienation from normal conditions, and consequent deterioration that had taken place in the two generations immediately preceding; if the girl had not been taught to read until six years old, and then limited to proper intellectual application; if without excess of reading she had been encouraged to such physical exercises as her constitution required; if she had been taken from the piano stool for one-half the time she occupied it, and placed on horseback, she would have had an appetite for food, been larger in size, developed in form, and might not have been near-sighted. She would have lived longer, and if it had been her fortune to have married into a healthy line of descent she would have borne children through whom, in the next generation, if their marriages were also healthy, nature would have perhaps restored the alienated forces, and a vigorous line have been re-established.

In default of any intelligent attempt in her behalf in the last opportunity afforded, the inherited and acquired debility became fatal, and the particular branch of life she represented was stricken off.

So in the other instance, notwithstanding a particular taint in the blood which nature resents with more tenacity than any other, if the girl had been virtuously reared and her physical system had opportunity to contend with its pre-existing deteriorations, with such advantages as thorough sanitary surroundings would have given her, she, too, might have lived and married, and, if with a healthy person, borne children, and nature would have had an opportunity to correct in that generation and the next the wrong done in the preceding. All favorable conditions being absent and replaced by those of a tendency to continue and aggravate the alienation from sanitary processes, the deterioration as in the other case is complete, and the line perishes.

Nature in each instance has obliterated the deviating line, as she always does, when no conservative measures interpose to correct it. All morbid deviations from sanitary conditions have a tendency to further deterioration, and there is a point at which it must be final.

"What," asks a profound medical writer who recognizes a physical failure as always antecedent to mental alienation, "are in reality the asylums for the insane but the concentration of the principal degenerations of the human race?" The same writer adds: "Man, created to attain the end appointed by Infinite Wisdom, cannot do so unless the conditions which insure the permanency and progress of the race be more powerful than those which tend to deteriorate and destroy it; and some cases of incurability against which the physician's best efforts are shattered, are but the fatal termination of a series of anterior existences morbidly summed up and represented in one doomed individual."

As I have before intimated, the downward progress and final catastrophe is often delayed or averted by intermarriage of the weak with the strong during successive generations. This is, of course, not for the advantage of the strong, and nature does not recommend it in that direction. When it takes place, however, in the interest of the weaker, not as to sex but condition, nature accords the benefit or withholds it in proportion to preponderance of tendency.

Although the illustrations used apply to all conceivable cases transgressing sanitary laws, I will add another. Two young men, concerning whom all things are equal as to bodily condition, and as to predisposing elements by inheritance, start out together. The one, with praiseworthy desire to achieve great ends devotes himself to more work in study or otherwise than his system, under the privations to which he subjects it, can endure. Taxing his energy in still greater ratio as his strength fails, his appetite is lost, his color fades, until at last as he is about ready to commence the duties he has destroyed himself to prepare for, his faculties of both mind and body give way, and he dies upon the threshold of the busy mart of commerce or temple of learning or of worship into which he has sought to enter.

The other, allured by all the temptations that beset youth, and resisting none of them, takes no heed to his way, exhausts his strength in the same length of time and is disgraced. The friends of each weep over their loss; and while those of the former are consoled by the purity and loveliness of the character so prematurely overshadowed in death, yet it does not occur to either party how much in a sanitary point of view they owe their losses in common to alienations from essential conditions, which, though differing in kind, took the same direction and were equally fatal.

The process of nature in divesting the tree of life of deformed, enfeebled, or fruitless branches, when such have passed beyond probable restoration, is conservative of the species, and were it not the rule, general deterioration of the race would be certain, and the limit of its duration rapidly approached. Indeed, it would long since have disappeared from the earth.

If two seriously impaired constitutions join in family relation, though they may live by mutual kind offices and good nursing to something like old age, yet their offspring will barely survive the age of child-bearing, and if they again shall marry husbands or wives of a similar degree of deterioration the probabilities are against their having children; but, if they have them, they will be defective in one or more ways, and develop the abnormal conditions inherited, often with variations and exaggerations, and die before maturity.

Nature will have cut off the descending line, or, to borrow an expressive phrase, have stamped out the product of digression from her laws. Every depreciating tendency of this kind arrested obviously raises the average tone of the public health and develops progress to higher ends.

This paper has only undertaken to deal with the most general principles, and these in merest outline. A subject for thick volumes cannot be even indexed in the brief time during which I may hope for your attention here.

Some good will have been accomplished if I shall be able to direct public notice to the general fact so well known, and by many so little considered, that nature has cut for sanitary laws a channel of their own, and no exemplary conduct under other regulations will afford the least safety to one who shall attempt to move counter to its current as it flows onward in obedience to the eternal fiat of Him who has for the good of His children fixed its conditions and directed its way.

A knowledge of this has its resulting obligations; they are innumerable, and embrace the whole conduct of life, not to the exclusion of, but in harmony with moral obligations. They include man's duty to himself, the circumstances of his marriage, the care of his children; and they include the duties of municipalities, and states and nations, out of which have grown such organizations as boards of health, and other precautionary and corrective associations. These have in view all questions of quarantine, contagion, sewerage, ventilation, infection, which, neglected, may some of them form alliances and project a plague to which the innocent and the guilty may be alike exposed.

There are great calamities which, with our present knowledge, we may not be able to contend. Often the pestilence so walketh in darkness that its footsteps cannot be traced except by the cries of its victims. Hurricanes, also, devastate districts, sweeping down habitations, and enraging the seas, scatter indiscriminate death by land and water, irrespective of merit or condition. Earthquakes not only "topple down steeples," but sometimes

"Smack their mumbling lips
O'er a thick peopled city."

Men are not wholly selfish either as to themselves or the generations in which they live. The patriot soldier forfeits his life to perpetuate that of his nation; in the very article of death his *vivas* ring out with "Long live the republic;" the statesman labors to provide constitution and laws that will give endurance to his country; the Christian father, as he attaches value to his creed, seeks to transmit it free from error or defect to his sons and daughters; physicians are always on the alert for sanitary discoveries that may improve the present age and reach forward to coming generations.

The indications are that our race is still progressive physically in the direction of its maximum possibilities; the average duration of life is a little extended; plagues appear at longer intervals and are less severe; contagions have been made amenable to human control. The movement is very slow, because the gods grind so slowly and so exceeding small. But comparing centuries with centuries, we obtain observations that demonstrate the progress and make it seem worth while to live; while the immense advance in mental and mechanical attainment of itself implies a healthy direction in sanitary condition.

It must continue to be the duty of the boards of health to keep up the onward movement, so that in the voyage of life the fleet, freighted with all our great worldly interests, shall not lose steerage way; because if permitted to go astern or drift otherwise, the time will come when the soldier with feeble knees shall lean on his musket for support in an uncultivated and barren land; statesmen and politicians, imbecile or insane, will dissolve into dust in conventions, like the horse shay on the road; attenuated preachers will stretch out thin hands over congregations of lost bodies, dyspeptic and morose; and physicians, themselves cadaverous, will have for patients the public in a decline.

A military engineer, estimating the course of a projectile, has first to calculate what would be its force and progress if moving in vacuum; he then considers the atmospheric conditions through which it must pass, and the degree of the earth's attraction that must ultimately bring it down.

The physician in calculating the progress of the public health has first to consider what would be life's average duration were all things favorable to longevity. He has not all the advantages of the engineer, because the obstacles are more complex and variable in action; the atmospheric effects are not so nearly equal, and the earth's influence not so uniform as gravitation, though equally certain to bring the body down at last. He can only approximate the positive truth and apply his learning to a comparison of probabilities with facts, learned and treasured up by his cotemporaries and those who have gone before him, a series of observations out of which science is slowly evolved.

The writer of this paper, having no professional learning and little science, with no exact and complete knowledge of anything, may perhaps represent the average condition of the people who look to such learned doctors as have called this convention, that they may so direct us, not only as to our public safety, but as individuals, that we may hope to escape the necessity of their more particular and professional personal services.

Mr. Lord's paper was received with enthusiasm, and a vote of thanks was tendered him.

W. F. Craig, C. E., of Detroit, read the following paper on "Inspection of the Sewerage System of Detroit."

THE SEWERAGE SYSTEM OF DETROIT.

BY W. F. CRAIG, C. E.

Ladies and Gentlemen:—Being a native, and feeling proud of Detroit with her broad paved streets, her educational and corrective institutions, her fine business blocks and elegant residences, her beautiful river and voluminous water-supply, and having received inquiries concerning her sewers and sewerage-system, and not being able to give an account of them, as to my knowledge, no examinations have been made except in cases where complaints have called attention to some particular locality, my curiosity led me to offer an examination of some of them, which was accepted and forwarded in every possible manner by Mr. Langley, the present member of the board of public works, in charge of sewers.

The city is admirably situated for the water transportation and disposal of sewage, being on the bank of a river of great volume and rapid current, and with the surface of the ground rising gradually to a height of thirty-five feet at the northwest corner, and fifty feet at the northeast corner, except at Jefferson Avenue, where the rise is a little more abrupt, to a height of about twenty feet. The soil and subsoil is generally an impervious clay, interspersed with pockets of quicksand.

The area of the city is 13.1 square miles, of which about six square miles are sewered and drained quite completely by means of public and lateral sewers; four miles, by public sewers having grates placed in the lower portions of the streets; and the balance partially, by means of road ditches running to sewers,—and which is accomplished so far by 72.7 miles of public sewers ranging in size from a 12-inch pipe to an 8-foot cylinder, and with a depth of from 6 to 42 feet, and with grades from 1 inch to 3 feet rise per 100 feet; and 90½ miles of lateral sewers averaging about 9 feet in depth, with grades generally of 1 foot in 200, and usually 15 by 20 inches in size. The section of the sewers built by the board of public works is an egg shape, and the brick work executed by them is probaby as good as that of any other city.

In presenting to you, to the best of my ability in the short space of time allowed, the manner of sewering the city, I will take the liberty of prefixing a few of Rawlinson's suggestions on the subject spoken of, for the purpose of comparison, and which I hope will elicit further information on the subject as well as awaken our citizens to the necessity of stirring themselves in the matter.

House Drainage and Ventilation.

Rawlinson says: "Main sewers and house drains should remove all solids, sediment, and flocculent matter from the sewage, and where practicable not less than twice their full diameter of the sewer below basement and cellar floors to prevent house drains from being back-watered. Drains from basement to sewer should have a clear fall of not less than 1 foot in 60, and should enter the sewer by a junction specially provided for the purpose. The utility of sewers will depend upon their proportions and soundness, and these will be influenced by the skill with which they have been apportioned to the work to be performed and the truth and soundness of their execution. In sewering a town the main sewers should first be completed, side junctions having in all cases been provided and indicated on the plan, house drains, in detail, may then be proceeded with.

"The safety and comfort of the inhabitants will depend more upon the proper arrangement and perfect construction of house drains, water closets, and sinks than upon the main sewers; but, in many cases, local authorities after having carefully constructed main sewers, have paid insufficient attention to house drains, the results being great discomfort, injury to health and discontent.

"There is the power in the English public health act (1875) which authorizes and enables a local authority to serve notices relative to house-drainage, and at the expiration of the time to undertake the work and do it properly, charging the cost to the owner. Builders, however, are frequently permitted to execute works of private drainage without any supervision, which leads to mistakes and to mischief, and if the house is subsequently drained in a proper manner, to much extra cost.

"In some towns the most of the drains are of defective material, the design and workmanship being worse than the materials; as the drains have no regular invert fall and the joints are open and leak, the whole basement being traversed with them, the subsoil is a swamp of sewage; then there are sinks inside sellars, and sink grates on the floors, through which sewage gases pervade the internal air.

"The proper junction of house-drains with sewers should be imperative, and house-drains should always be executed in accordance with a sanctioned plan, the local authorities insisting as far as practicable upon every house-drain being designed, constructed, and carried to the main sewer under the supervision of their engineer.

"To sewer a town and leave the house-drains to haphazard construction is little better than to waste the tax-payer's money. Comfort and means for health are only to be secured by the best house-drainage, and the best house-drainage will not be accomplished by builders working under no responsibility.

"No house-drain should ever be joined to a sewer direct so as to form a continuous flue by which gases may flow into the house, there must be a break in the drain and means for ventilation.

"Earthen-ware pipes of equal diameters should not be laid as branches or tributaries, as 9-inch into a 9-inch, or 6-inch into a 6-inch, but a lesser should be joined on to a greater.

"House-drains should not pass direct from sewers to the inside of houses, but all house-drains should end at the outside wall. House-drains, sink-pipes, and soil-pipes should have ample means for external ventilation. In towns where houses have to be drained from back to front through the basement, drain-pipes should have an effectual joint and be bedded and covered in concrete, such drains being ventilated back and front on the outside of the house. Flues in wall should not be used as sewer or drain ventilators, and all pipes used for that purpose should be external, the joints should be air-tight and the top should be taken above the ridge level of the roof, and should not be a less diameter than four inches.

"Sinks and water-closets should be against external walls so that the refuse water or soil may be discharged into a ventilating trap and drain outside the main wall; down spouts may not be used for ventilation, as the head of such spout may be near a window. Water-closets or sinks fixed within houses and having no means of direct day light and external air ventilation are liable to become nuisances, and may be injurious to health, and if they cannot be ventilated in an efficient manner, had better be removed. Water-closet stack-pipes should be formed with solid drawn lead pipes or with cast iron pipes with air-tight joints, and each pipe should be carried up its full diameter through and above the roof to permit of free ventilation. Inlets to all pipe-drains should be properly protected so as not to admit sticks, stones, or solid materials.

"Discredit is brought on both sewers and sewer ventilation where cesspools exist and these are connected so as to overflow or are emptied into the sewers. The refuse is putrid, the stench most offensive. Those who are ignorant of the cause of the nuisance blame the sewers and desire to block the ventilation. The true remedy will be to abolish the cesspools as quickly as possible, flushing the sewers regularly and abundantly, when the offensive nuisance will cease. A few gallons of putrid cesspool matter flowing into a sewer, or if emptied into it, will cause more nuisance than the fresh drainage of many houses.

"Wherever traps are placed in a sewer or drain there should be means provided for ventilation to relieve such traps, as they are only useful and safe in conjunction with full and permanent means for sewer ventilation.

Main Sewers.

"Main sewers must not be of capacity to contain flood-water of the area drained, as such flood-water should be passed over the surface or by special channels and flood-water drains.

"Main sewers should be laid out in straight lines and true gradients from point to point, with side entrances, man-holes, flushing and ventilating arrangements at each principal change of line and gradient. All man-holes should be brought up to the surface of the road or street to allow of inspection, and should be finished with a cover easily removable. When sewers are laid out in straight lines and the surveyor insists upon absolute truth of workmanship both in line and in gradient, the work will necessarily be well done. With man-holes and lamp-holes at each change of line or of gradient, the surveyor by removing the covers can at any time set out the central line of the sewer upon the surface, and can ascertain the depth from the surface to the sewer at any intermediate point, and so find the exact position of any side junction. Some surveyors cannot at first see (so as to appreciate) the full advantages of right line arrangements, and do not find it out until the works have been completed and they wish to form junctions, or to examine the sewers for cleansing and flushing, when they discover that the whole of the works, by reason of the man-holes and right lines, are fully under inspection and command.

"Main sewers may have flood-water overflows wherever practicable, to prevent such sewers being choked during thunderstorms or heavy rains. An overflow to be of most use should permit the sewer to be flowing full, and it should be so situated, formed, and protected, as to relieve the sewer by an opening formed like a bye-wash.

"Main sewers should not join at right angles unless the curve and extra fall is provided in the manhole. Tributary sewers should deliver sewage in the direction of the main flow through the manhole by the invert arrangement.

"Sewers of unequal sectional diameters should not join with level inverts, but the lesser or tributary sewer should have a fall into the main at least equal to the difference in the sectional diameter. The junction of sewers and drains should be made with care, so as to permit of the delivery of sewage from side sewers and drains in such manner as shall not tend to impede the sewage of the main sewer in its flow. If the inverts of tributary sewers are not above or at least are not on the level of the ordinary flow of sewage in the main sewer, such tributary sewers or drains will be liable to be back-watered, in which case deposit will take place in the length of submerged invert, and so the tributary sewer or drain will become choked with its own silt. Many drains are so choked where all the inverts in a flat district join on the same level, because the sewage in the main sewer, which is in some degree constant, back-waters the inverts of the tributaries as described, which tributaries are only in use intermittently.

"Side junctions for house-drains should be provided and be fixed on all new sewers and drains, being part of the contract and the cost included in the contract. During the construction of the sewer the position should be sketched and indicated by figures in a book or on a plan, and side junctions not used at once should be carefully closed for subsequent use. If side junctions are not provided and put in as the sewers are being constructed or laid, the cost of subsequent provision and insertion will be much greater. It will be cheaper to insert extra side junctions during construction rather than to have pipes to remove, or brick sewers to cut after the trenches have been filled in and become consolidated and the road or street surfaces made good.

"Sewer-outlet works should be simple in form, cheap in construction, and so arranged as to remove all solids, sediment, and flocculent matter from the sewage. Under all conditions sewer and drain outlets should be protected by a flap-valve which will admit of sewage flowing out and prevent the wind blowing in, and so driving sewer gases back to the town.

"Towns situate on land rising considerably will best be sewered in zones, that is, by intercepting lines of sewers contouring the site, as such intercepting sewers will prevent gorging the low level districts; as also prevent the rush of sewage down steep gradients at high velocities, which in times of heavy rain may burst the low level sewers at steep gradient junctions. By intercepting lines of sewers sewage may also in some cases be retained at such an elevation as to enable it to be delivered in the country by gravity, onto and over land for agricultural uses. Sewers with steep gradients, if the flow of the sewage is unbroken, get up a velocity in the sewage which is liable to be very injurious in its wearing action on the sewers. Sewage should not be allowed (except when flushing is in operation) to acquire a greater velocity at any state or time of more than six feet per second, as any higher velocity will take grit or other solids along the sewer invert with a cutting and disintegrating action rapidly destructive to the material of the sewer.

"Sewers liable to be affected by the rise of tides or land-floods, as on the seashore or on a river, must be so arranged that any backing of the sewage shall not injuriously affect the sewers and drains within the town. The lower portion of any system of sewers below the level of high water of the sea or land-floods of an inland river must therefore be cut off from the upper portions, and must be so abundantly ventilated that any sewage-gases may be forced out at points specially provided for the purpose, and not be driven inwards and up the steeper sewers of the town through the drains and into the houses.

"Means for full and permanent ventilation of town-sewers and house-drains are required to prevent stagnation or concentration of sewage-gases within sewers and drains, and with numerous openings from the sewers to the external air, as described. There will be unceasing motion and interchange betwixt the outer air and the inner sewer air, which will bring about and maintain extreme dilution and dispersion of any sewage-gas so soon as generated. It has been found by experiment that in unventilated sewers the gas concentrates and so becomes deadly, whilst in fully ventilated sewers the sewer air is purer than that of some stables or even than in a crowded public room when occupied. If sewer air at any sewer ventilator or at any other point should be offensive, additional means for ventilation on this sewer are required and should as soon as possible be supplied. Trapping should not be resorted to in such case; it may however be practicable to remove such sewer ventilator to some more convenient point.

"On a system of sewers, every manhole should be a flushing-chamber so managed as to be charged with water for flushing purposes; there should also be a flushing-chamber at the head of each sewer and drain, and every flushing-chamber should be permanently ventilated. Where there is a public supply of water the flushing-chambers may be filled from the mains; where there is no such public supply they may be filled by water cart. Flushing a sewer means accumulating water sufficient to pass down and along the sewer below with a rush when suddenly liberated, which water shall loosen and carry away all sediment. Leaving house-taps open, and propping the handles of water-closets will not flush drains and sewers, but will only waste water. It is possible to injure sewers by overflushing them, and it is therefore the duty of a local surveyor to understand this, and to avoid it.

"The charge is brought against water carriage excreta, that houses and towns are tainted with sewage-gas. The reply is in respect to houses. If any house is injured by sewage-gases the water-closets are improperly placed, the drains are within the house, and neither drains or water-closets are properly constructed and ventilated. It is practicable to drain a large house and not leave any open drain beneath or within it, and so to arrange and ventilate water-closets as to render any escape of gas within the house impracticable. It is also practicable so to sewer and drain a town that the discharge of sewage shall be continuous from the most distant point on the system to the outlet, that the motion in the sewers shall at no point be less than a rate of one mile per hour, and on moderately steep gradients much quicker. Thousands of houses are so drained, many towns are so sewered."

The foregoing suggestions, in my estimation, cannot be successfully gainsaid or questioned, and in the following remarks I propose to limit myself, as much as possible, to facts, leaving the readers to use their own judgment in comparison.

Detroit has an ordinance to prevent solid materials from entering sewers, but it is not enforced; also an ordinance to have all private drains constructed under the supervision of the engineer, which I am informed by Mr. Ruehle, of the board of public works, the city council rescinded; at any rate it is not enforced, each property holder laying his own drains, generally in the cheapest manner he can. Those that I have seen have generally been constructed or laid as flat as possible to save digging, and then pitch into the top of the sewer, no special pains being taken to keep them on a regular grade. The city making a right-angle connection with the main sewer, no provision being made in the construction of the sewer except where connections have been at the time. In the old sewers private drains were constructed of wood boxes, which are still in use, as well as in some of the newer sewers, with their ends from one foot inside to one foot outside of the sewer walls, and in all states of preservation. Laterly sewer pipes are generally used. In Germany the subject is considered of such importance as to use, in some instances, glass pipes for the purpose. The city also has an ordinance that all dwellings, stores, manufactories or shops shall be provided with a suitable privy, the vault of which shall be walled up with two-inch plank, brick, or stone, and be sunk at least four feet below the level of the earth, and when there is a public sewer within 100 feet of such privy it shall be so connected as to drain into such sewer.

The sanitary police have charge of that branch of the city service relative to sanitary measures, and as they were to present a paper to this meeting, I will only remark that in 1878 they served 867 notices of overflowing and unclean vaults; 213 notices of defective drains, and 949 cases of filthy private places, and it is their custom to have house-drains connect with vaults where the vaults connect with sewers.

In the Engineering News is an abstract from a Chicago paper saying that trouble has been found by furnace pits in cellars being below the cellar floor, and the drainage being imperfect, a nuisance was caused by the heat from the furnace vaporizing the sewage matter that soaked into it. As I know of one house that was in the same condition, I mention it.

Lateral Sewers.

It has been and is the custom in this city to build lateral sewers in all alleys as soon as application is made for the same, the property adjoining being assessed to pay the cost. They are usually built of brick, egg shape, and 15 inches by 20 inches in size and having a grade of one foot in 200, which is sufficient to keep them clear with any ordinary matter. No provision is made for inspecting them by means of man-holes or lamp-holes, or for their ventilation or flushing, except in some instances street grates or receiving basins have been connected with them, and where such connection has been made I have not heard of their clogging up from that point to their outlet. Mr. Glasier, who has the most perfect knowledge of the city's sewers, informs me that from their dead ends to about their middle, a distance of from 100 to 600 feet, it is usual for them to be more or less filled with deposit, and I noticed that when they connect at the bottom of the main sewer, which is frequently the case, the deposit reaches from the commencement, but which is caused by the manner of supplying the matter to them. Mr. Glasier also informs me that traps, when placed between privy-vaults and sewers, have not operated successfully more than six months; and now very few, if any, are in use in such position, leaving an opening in the vault for sewer-gas to rise at any of the numerous connections thus made. All the laterals are connected with the publics at the most convenient place from the bottom to the top of the public, and at or nearly at right angles with the main sewers. There is no fixing the size of the sewers relative to the work required of them, they being the same size for sewers whether 200 or 1,200 feet in length, intending to drain ¼ of an acre or 8 acres. I have noticed that in building new lateral sewers it is the custom for the connections that are called for by the residents to be made by the contractor; and as usually the sewers are not called for until overflowing vaults make it a necessity, the contractor will run the crock to the vault, when from 1 to 3 cubic yards of the putrid mass will be allowed to enter the sewer at once, which causes an unbearable stench as well as furnishes material to clog up the lateral and work its way into the sags and dead water of the main sewers (cause enough for sewer-gas.) I understand that Mr. Ledbeater, who had formerly the charge of sewers, would not allow a full vault to connect with a lateral, and he is entitled to that much credit. It is needless to state that laterals having no defense are in some places well supplied with sticks, stones, brick, and other solids; and I estimate that of Detroit's 90 miles of lateral sewers, 50 miles are elongated cesspools, and the balance lacks but little of it from the matter passing through them and absorption of brick; and it is of the highest importance that some means be taken to flush and ventilate them, as well as to regulate the connections made with them and so arrange, if possible, that all decomposable matter be supplied in as fresh a state as possible, and not allowed to lie in the vaults until putrid, as is now generally the case, they not being constructed upon any approved plan, and not drained to their bottom when connected with sewers, except in a few instances.

Public Sewers.

The construction of some of the older sewers has been very deficient, they being laid with dry bottoms with the top arch grouted or laid in common lime, which has since dissolved or worn away, and are now much out of shape, as may be seen in Randolph and Riopelle streets, and I presume in most of the sewers built at that time,—as well as rising the hill at Jefferson avenue and Fort street at a very steep grade, making them from that point too high to effectually drain many of the deeper cellars connected with them,—as well as having numerous depressions which allow sediment to accumulate, and which is the case with nearly every sewer in the city. Among the most foul may be mentioned Labrosse, Seventh, Fourth, Lewis, Second, Second below Michigan, Grand Sewer, and Randolph street sewers, the deposit reaching 1½ feet in depth and in some instances more, with numerous shorter places of the same kind in other sewers and all the outlets.

Among the peculiarities of the sewers in this city is the manner of their connections. At Seventh and Michigan a sewer 3 feet 9 inches by 5 feet, discharges into a sewer 3 feet in diameter on the same grade. At Fourth street, south of Michigan avenue, a 4-foot cylinder discharges into a 3-foot cylinder as before. At the Eleventh street outlet there is received the Seventh street, Trumbull avenue, and Twelfth street sewers, and in my judgment it is not too large for Trumbull avenue sewer alone.

The Grand sewer receives Cass street sewer and Shelby street sewer, and is of smaller section than the former (Cass street sewer), besides having an outlet impeded by water-pipes 8 inches in diameter passing directly through it, and which is the case with the same sewer east of Woodward avenue, 6 pipes passing through it at different places. Nearly every sewer connects with another at right angles and often on steep grades, making their effect at clogging the receiving sewer the more severe. At the corner of Third street and Canfield avenue the Third street sewer curves up stream to make as near a right angle connection as possible. At the corners of Beaubien and Fremont and McDougall avenue and Fremont streets are curves that would do credit to a snake, and need to be seen to be appreciated. The Woodward avenue sewer below Woodbridge street seems to have had no bottom except the original clay, being constructed with side walls arched, and has washed out in places. The bottom was washed out of the old Grand sewer in a dozen places, also the sewer at the corner of Fifth street and Michigan avenue, as well as innumerable small holes in the top of the older sewers.

Sewers were built as far back as 1836, and are still in operation, although too large, as mentioned in Mr. Smith's report of 1861; but now, as improvements have been extending in their districts and more territory drained into them than intended when built, they have been found inadequate to carry the water or too shallow to drain the cellars, which has called out attempts to relieve them by connecting any other sewer in their vicinity that might relieve them for the time being, which already has made such a labyrinth of sewers that it would puzzle any one to tell where certain rainfall enters the river; and of such sewers, I should doubt the utility of running a sewer through Locust street from Crawford street to Trumbull avenue to relieve Crawford street sewer, when Trumbull avenue has an insufficient outlet for itself, besides depriving Fourth street sewer of its water and making it the most foul sewer in the city, and without providing some means of flushing it. The same is the case with Labrosse street sewer from Fifth street to Trumbull avenue, only the connection of Labrosse street sewer is so low at its outlet, and being stopped with quick-sand, that it contains about 1½ feet of matter that most persons would prefer to see at a distance. Although these sewers may do some good it is principally to the extent of their capacity in holding water, and under pressure undoubtedly deliver some of it to its outlet.

I should also doubt the healthfulness of draining the old Grand River avenue sewer into Cass street sewer and leaving it open to be flooded or back-watered, allowing the matter to settle, when on the receding of the water it becomes a first-class gas-machine. I should also doubt the utility of spending big money for a cut-off for Randolph, Brush, Beaubien, and St. Antoine street sewers, in Woodbridge street, when the same several sewers at Fort street east are only about 8½ feet deep to their bottom, when by extending the cut-off up to about Gratiot avenue where the ground is higher, and consequently the sewers have more depth, and by so doing utilize the sewers above that point, and devise sewers suitable to the requirements of the points below.

Every outlet in the city is inefficient for the capacity of the sewer leading to it, they being built nearly or entirely submerged, which allows the water to back in them from 200 feet to 3,000 feet, thus allowing the sediment to settle in them (from the slack current in the ordinary flow), and give off the dangerous gases as well as chokes the outlet, when required by storm-water, and as a consequence most of the sewers have been under a pressure of water or back-water from 6 to 30 feet, backing into drains, cellars, etc., and doing much damage as well as driving all sewer gas into the most convenient opening, traps to the contrary notwithstanding. And taken with their right-angle connections, I should judge that they will not carry within from 30 to 50 per cent of what they should carry and were evidently calculated to carry, which is a very important item when they will not now carry freely and without flooding as much as is demanded of them.

Lately side man-holes have been constructed in all the deeper sewers for the purpose of making a cheaper connection for receiving-basins and laterals, giving the water a dead fall of from 3 to 25 feet, vaporizing the sewage, which may be carried up the sewers, without providing means for ventilation, or to give direction to the water falling, that it may not impede the water-flow in the main sewer, as well as preventing an inspection without a bath when there is water flowing in them. In several instances main sewers are connected the same way, as may be seen at the corners of Woodbridge with Beaubien and St. Antoine streets, at the corners of Fremont street with Russell street and Grandy avenue; and at the corner of Randolph and Woodbridge streets a 5-foot sewer discharges into an 8-foot sewer direct in the top with at least seven feet fall in the clear, notwithstanding the 8-foot sewer was intended to drain four other sewers back of this connection, and I think it a disgrace to any one having to do with it.

To my knowledge there has been no attempt to ventilate or flush our sewers, nor is there a flap-valve to prevent sewage-gas from flowing free, which allows it to concentrate. Formerly ventilation was partially accomplished by means of the receiving-basins being untrapped, but so many complaints were made that finally those in the greater portion of the business part of the city have been trapped, as well as along most of the paved streets where stone receiving-basins have been placed. All grates in the unpaved streets are placed over the open ends of pipe and are not trapped, and generally being in back streets are not so much heard of as a nuisance, although frequently the gas is well concentrated, and I have noticed it very strong on the sidewalk in certain stages of the atmosphere. Although I am well aware that at the ordinary temperature of the sewers (about 65°) certain stages of the atmosphere will cause a down draft, it has been and is I think generally up in both public and lateral sewers, and I am perfectly satisfied in my own mind after a careful examination of the sewers, that with the good general grade and the volume of their ordinary flow, if they had a sufficient outlet, and such matter as was given to them was given fresh, and the laterals and dead ends of the publics flushed, with some of the connections altered and the numerous small obstructions, such as small piles of brick and mortar and other collections removed, that no nuisance would be caused by untrapped receivers and grated man-holes, which would have the effect of thoroughly ventilating them, and obviate largely the danger and nuisance now caused by them.

Considering that the sewers between Beaubien and First streets, and between Fourth street and Trumbull avenue are all connected by these tap-sewers and the gas may be freely transposed, I wonder what the effect would be should an epidemic strike the city that could be carried by sewers. I am informed by assistant city clerk Kelly that the death-rate is less than any other city, and at the same time he says that the average is about 180 per month, and as they are compiled from the entries in the cemeteries, and not all of them, I doubt the correctness of the rate, and think it more.

Rainfall and Sewerage.

It is a much disputed point about the size of sewers to accommodate rainfall. The city of Saratoga is thoroughly drained by a 3-foot sewer, while Philadelphia has a 20-foot sewer to accommodate 3,000 acres, and the city of Washington is now constructing a 22-foot sewer to dispose of rainfall. It is my estimate that in this city in the districts that are covered and paved, during heavy storms about 80 per cent of the rainfall reaches the sewers almost immediately, and in the resident portions from 30 to 50 per cent, as the ground being impervious, measures have been taken by the residents to dispose of it to the sewers as soon as possible, and as there are no natural channels for the water there is no recourse but to provide sewers for the purpose; and as the sewers were evidently calculated by Roe's tables for one inch per hour on sewage, with perfect connections, etc., it will be seen by the following few rain storms that they have all they could do even if they were perfectly constructed, instead of being deficient in carrying capacity from 30 to 50 per cent of what they should be.

DATE.	Rainfall, in Inches.	Time in which the given amount of rain fell.	DATE.	Rainfall in Inches.	Time in which the given amount of rain fell.
August 21, 1875	1.15	0 h. 30 m.	July 10, 1879	2.05	1 h. 38 m.
May 29, 1876	1.65	1 h. 15 m.	July 23, 1879	0.99	1 h. 7 m.
July 31, 1878	2.48	0 h. 45 m.			

I am indebted to the U. S. Signal Service Department for the table of rain-fall.

Plan of Sewerage.

An able report and plan of sewerage was made by E. Willard Smith in 1861, which included the district between Fourteenth avenue and Chene street south of a point about two miles back from the river. The plan being to extend sewers up Chene street, St. Aubin avenue, Riopelle street, Beaubien street, Cass street, Third street, Sixth street, Trumbull avenue, Twelfth street, and Fourteenth avenue, all running into an intercepting sewer which would discharge at Woodward avenue and Fourteenth avenue, with waste weirs at all the old outlets for storm-water,—which I think would have been a success, up to their capacity, for the simple reason that the outlets would be supplied with enough water to keep them clear, and the storm outlets would not be continually silted up and choking as is now the case, being dry except when called on for storm-water. The sewage matter being less than one-sixtieth is not here essential in regulating the size of the main sewers except in form and grade.

Another system was recommended by the sewer commissioners in 1871, which has since been completed. The plan being to run sewers up Eighteenth street and McDougall avenue to a line about 2 miles back from the river, thence running towards each other to John R street and Cass avenue respectively, intended to drain all the district north or back from that line, and of which I would call your attention to Mr. Ludden's report of 1877, saying: "It is not known upon what data the sewer was calculated, and that it is not capable of draining more than 1,800 acres, while 3,000 acres is within its district"; and I will now add that although not draining 1,000 acres and with very few lateral connections, it has been full within 3 feet of the paving at Michigan avenue, and even full at Trumbull avenue, 2½ miles from its mouth; and it looks to me as though Detroit has some expensive blunders from working on the no-plan principle, as well as burying her sewers under water, without having sufficient height before connections are made to prevent their flooding in severe storms.

W. F. CRAIG.

Dr. Brodie followed this paper with a few remarks. He said he did not know the sewerage system here was so bad. The death-rate was low, and he did not understand why, under the facts as presented in this paper, it could be so.

Dr. A. F. Whelan, of Hillsdale, moved a vote of thanks to Mr. Craig, and made a brief speech, saying he was astonished that such a state of things should exist in Michigan's metropolis.

Dr. Whelan's motion was carried, and the convention adjourned to 9 A. M. Wednesday.

Fourth Session, Thursday Morning, Jan. 8, 1880.

The first paper of the day was by Dr. Duncan McLeod, on "Ventilation of Dwelling-houses." As the manuscript of this paper has not been received, only the following abstract can be given. It is taken from the Detroit Post and Tribune.

ABSTRACT OF A PAPER ON VENTILATION OF DWELLING-HOUSES.

BY DR. DUNCAN MCLEOD, OF DETROIT.

Dr. McLeod, after explaining the amount of carbonic acid in the atmosphere, and its other constituents, said that on account of its nearness to a large and rapid river, the height of the ground on which it was situated, and its many other sanitary advantages as a city, Detroit was one of the healthiest in the Union. Prominent among the reasons given was the fact that the houses are scattered more than is usual. But the exceptional health of Detroit was not due to the houses or their ventilation. He estimated that 35 per cent of the deaths in Detroit, or 650 in all, was due in whole or part to foul air. Analysis of air taken in different parts of the world, in city and country, Summer and Winter, day and night, show that the amount of carbonic acid gas is a good test of atmospheric purity. These analyses show an almost equal purity of external atmosphere all over the world. The consumption of coal in large quantities in cities, with accompanying volumes of smoke, does not materially vitiate the air for breathing purposes. In houses, school-rooms, and theaters, most of all in sleeping-rooms, the evil influences of carbonic acid are felt. Fresh air is, above all things else, the necessity for health. The residents of a poorly built house are less liable to pulmonary disease than families occupying fine houses which are kept closed to the outside atmosphere. The speaker devoted considerable time to the subject of night air, which he said was at least not as injurious as the atmosphere of an unventilated sleeping-room. Considerable space was devoted to the cellars of our houses, which he said were too often neglected. In the Summer they are not so badly ventilated as in Winter, when the carbonic and other gases exhaled from fruits, vegetables, and meats find no escape to the outside world, the cellar being closed, on the principle that the air is pure enough if it is cold enough. To guard against all these numerous evils should be the duty of all, and especially of the sanitarian, lest violating the law of health we be compelled to pay the inevitable penalty.

On motion of Dr. Kedzie, the paper was received with thanks.

Mr. Thomas A. Parker read the following paper on "The Principles of Ventilation."

THE PRINCIPLES OF VENTILATION.

BY THOMAS A. PARKER.

Ventilation is the act of substituting pure for impure air, but which for various reasons is seldom or never accomplished. The ancients, who possessed no definite knowledge of the subject of air, nevertheless recognized its importance by enumerating it among what they considered the four primal elements, fire, air, earth, and water. Of all kindred subjects, that of ventilation is the most simple and the least understood. Scientists and sanitarians have talked long and often, essays have been written, architects have planned, years have rolled by, but however much experts may know of this subject, in practice, the much mooted question is still unsettled, and simply because people will not pause to think. Few care to read about what are usually characterized as dry subjects, topics which are seldom understood, even by those who take the trouble to consider them. Many do not even care whether they breathe good air or bad, especially if there is any trouble or expense involved. Even the greatest, best, and cheapest of all ventilators—the sun—is excluded by rich and poor alike. Many expend considerable sums of money without deriving the slightest benefit for their outlay; money is freely lavished in vain attempts to remedy defective drainage and plumbing; numberless patented articles are constantly being offered and introduced, which are in turn replaced by others as equally unsatisfactory as the first.

Now, what is the remedy? Simply conform to the laws of nature. One of those laws is that heated air ascends. By observing and acting upon this law we can easily drive it not only upward but outward from our dwellings. The problem is only how to do this in the most effectual and least objectionable manner. The difficulty is in Winter ventilation; in Summer we should act on the same principles that guide us in the Winter, but for different results. In addition, we should admit any amount of fresh air that is conducive to our health and comfort. In Summer, keep out the heat in the same manner in which we exclude the cold in Winter. Keep the house light, warm, and dry, both in Summer and in Winter, and admit as much sunshine as possible. In Winter, when a house becomes overheated the air feels very dry and unpleasant, and people endeavor to assist nature by moistening the air, forgetting that as the temperature of the air falls to its normal condition the water which the overheated and expanded air absorbs will be precipitated and will lodge upon the windows, walls, and other objects in the room. The better way is to expel the hot, dry air and let in air of a cooler temperature. The custom of having pans of water placed upon stoves, or upon or inside of furnaces, for the purpose of moistening the air, is highly objectionable.* The pans are generally empty, the servants forgetting to fill them; and in place of their containing pure, fresh water, put in every few hours, they will, if used as stated, be found to contain dirty water mixed with dust, ashes, rust, etc.

The chimney can, to a very great extent, be made to assist in purifying the air in every story, from cellar to attic, and in every room in the house. In building a house, chimneys or other flues should be arranged so as to provide for ventilation as well as for smoke. The chimneys should be located in an inside wall (with two or more separate flues), except the kitchen chimney. This arrangement materially assists in warming the house, and makes it convenient to ventilate the upper rooms by means of fire-places or by openings in the flues.

Ventilating rooms at night by means of an open window should be practiced with great caution. However, I admit the great benefit of fresh air, and under ordinary conditions of the atmosphere this method of introducing fresh air into a room is quite proper, and is often absolutely necessary. On the other hand, aside from the danger to health from draughts, there are many mild nights when the air is filled with the germs of disease. Especially is this the case in the country, when caused by the exhalations of decaying vegetable matter and from marshes, sluggish streams and ponds; in short, from heat, moisture, and decaying vegetation. These three things in combination are the great agents for the production of miasm. I believe that the night air of large cities is better than the night air of the country. The night air in large cities is purer than the air during the day. The most unhealthy hours of the 24 are soon after sunset and at sunrise, as at those hours noxious vapors are constantly descending or ascending.

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*[Mr. Parker's opinions on some subjects do not agree with those of others, and as it is by free comparisons of views and facts that truth is reached, I venture to ask leave of Mr. Parker to suggest in this connection that before coming to a conclusion in relation to the moistening of air in rooms in Winter in this climate, the reader may do well to consider the great amount of evidence available on this subject, published in the articles on "Weekly Reports of Diseases in Michigan" in the Annual Reports of this Board, and in the articles on the "causes of deaths," in the volumes of "Vital Statistics of Michigan," wherein it appears probable that we must attribute very much of the Winter sickness and many deaths in this State to the dry air inhaled in Winter; the diseases apparently increased by dry air being bronchitis, pneumonia, influenza, and most of the contagious diseases because of the irritated and sometimes raw surfaces produced by dry air in the air-passages.—H. B. B., Sec. S. B. of H.]

Of all parts of the house, the cellar requires the greatest attention as regards cleanliness and pure air; for, being warmer in Winter than the rooms leading to it from above (the furnace heating it), the air is imperceptibly yet constantly ascending and is diffused all over the house. It is a well known fact that the cellar is generally a much neglected portion of the house, and is left to the servants to look after. In the cellar are often to be found those elements of disease—dampness, heat, and decaying vegetable matter,—the germs of which, under the name of miasm, may be either poisonous gases or vegetative life, or breathing animals. If cellars of dwellings are apt to be in this condition, what must be the condition of the basements of stores, factories, theaters, and other public buildings. A cellar is never so well ventilated in Winter as it is in Summer; as people think that when the cellar is cold enough it is sufficiently well ventilated without opening windows or outside doors. But the ever-useful chimneys are there, and the open flues at the base of them are constantly at work removing a portion of the poisonous air to the upper regions, or to the great laboratory of the sun, or to the fields and woods to the growing plants from whence it will be returned to us as pure as it was "in the beginning." The vegetable cellar should be connected with the nearest chimney by means of an eight-inch stove-pipe, and no vegetable cellar should be under a dwelling-house unless the former is well ventilated.

Churches, and theaters and other large buildings should be more thoroughly and systematically ventilated than they are. The evils of an ill-ventilated theater are too apparent to require their being pointed out. When our larger public buildings are occupied, it should be the duty of an experienced and intelligent person to devote his whole time to regulating the temperature and quality of the air in each. The ventilation of a public building, for instance an opera house, with its vast auditorium and high ceiling, is much more difficult than that of a private house. But, like private houses, flues should be built in the walls. The openings should be large and near the floor. However, even if these connections were arranged, the method to be adopted in introducing fresh air in an unobjectionable manner, without draughts or without an excessive waste of heat, is but imperfectly understood. I have often thought that if a hole was made in an outside wall of a very high apartment, say about three-quarters way from the floor to the ceiling, and a pipe inserted in the opening, leading nearly half-way across the room, that the hot air would drive the incoming cold air directly to the ceiling without making the slightest draught. Thus, the only objection to introducing fresh air into a room is clearly avoided.

Plants in flower are considered objectionable in sleeping-apartments, as they deteriorate the air at night. The ill effects are probably due, not to the formation of carbonic acid, but to the volatilization of certain volatile oils, many of which even in very small quantities, act powerfully upon the animal system.

Plants not in flower are not considered injurious in bed-rooms, as in the day-time they absorb carbonic acid gas and give off oxygen. At night this is reversed: they then absorb oxygen and give off carbonic acid gas. But at night this process does not go on so rapidly as in the day-time, so that plants, when growing, gain a large portion of carbon from the air. The magnitude and method of this wonderful operation of nature forms a very interesting study.

A subject which should receive a more liberal share of public attention than is now bestowed upon it, is the proper ventilation of stables. People should look at this subject more from a humanitarian standpoint and they would soon learn to appreciate its value in dollars and cents. A stable should be warm in Winter and cool in Summer, tightly built and spacious. The hay-loft, or the section next above that containing the animals, should be constantly aired. The air should be brought into the stable by shafts, used also to let down feed to the animals below. These shafts should be about 15 inches square, and begin at the floor of the loft and terminate a little below the manger. There is thus no draft on the animals, and the air is diffused all over the stable.

THOMAS A. PARKER.

DISCUSSION.

Mr. Harlow said he had listened to the paper with a great deal of interest. Ventilation, if it had been more fully understood during the war, would have saved the lives of a great many soldiers in the hospitals. At one time he remembered the cases of 100 patients ill with army measles, at a time when the regiment they were in occupied tents. Only one died. If they had been closely housed he had no doubt 20 or 30 would have died. He also related other similar instances.

Dr. Kedzie said we were constantly doing our best to seal up our houses. Papered walls were impervious to air, as were those painted. But brick walls whitewashed or covered with hard finish allowed some air to pass directly through them. The former he characterized as "choked walls" and "strangled walls."

Mr. Parker received a vote of thanks from the convention for his paper.

The president announced a paper on "Neurasthenia, or Nerve Exhaustion," by Dr. W. H. Rouse, of Detroit.

NEURASTHENIA.

BY W. H. ROUSE, M. D.

The trite proposition "I am tired" from being so frequently heard, seems to have lost much of its significance. Go where you will throughout the older portions of this beautiful land, and this indication of nervous exhaustion may be found. The American people are fast becoming as renowned for nervousness as for public schools and labor-saving inventions. The nervous stamina of our children of to-day is often invidiously compared, not only with that which prevailed many years ago in this land but also with that which may be observed at present in other civilized countries.

The indications of nerve-exhaustion, though occasionally rapid in their onset, usually come on so gradually as scarcely to attract attention, till considerable progress has been made, and even when noticed the demands of business, pleasure, or ambition, may prevent any change in the individual's life or habits.

One of the first symptoms of nerve-exhaustion usually observed is weariness without sufficient cause. One night's rest after an ordinary day's toil should enable the individual to resume his labors in the morning without especial effort. When nerve-exhaustion is well marked, slight exertion causes fatigue, and morning and evening alike the murmur is "I am tired." This feeling of lassitude has usually associated with it other symptoms, some of which cause not a little suffering. There are often a feeling of fullness in the head, headache, and impairment of the vision, backache, tenderness of the spine, and neuralgic pains in various parts of the body, myalgia and soreness of the muscles, as if they had been pounded, impaired action or palpitation of the heart, cold extremities, and impoverished blood, derangement of the digestive and excretory organs, defective memory,—subjects though easily memorized are more easily forgotten, and impaired powers of mental application. In some cases the mental faculties become so impaired that the student may sit for hours at a time at his books, oblivious to both lessons and surroundings, dreaming with his eyes open. If the exciting conditions continue, insomnia, insanity, dementia, or even death may ensue. Many persons of more than ordinary promise have been compelled by inattention to nature's kind warning, weariness, to pass lives unknown to fame, except mayhaps as martyrs to medical and gynecological science.

The effects of nervous exhaustion on young ladies, caused by application and worry in school, is not overdrawn in the following from Cabanis:

"A girl who enters puberty in blooming health and without an ache, is overtaxed and overtasked at school. She loses her appetite, and becomes pale and weak. She has cold feet, blue finger-nails, and complains of submammary pains; headache, and backache, and spineache, and an oppressive sense of exhaustion distress her. Her catamenia, hitherto without suffering, now begin to annoy her more and more, until they become exceedingly painful. Her linen is stained by an exhausting leucorrhœa, and bladder troubles soon set in. She is wearied beyond measure by the slightest mental or physical exertion; a grasshopper is a burden to her, and she finally becomes hysterical. Now, very unfortunately, the idea attached to this group of symptoms is, that the reproductive organs are at fault, and the unit of resistance lies in the womb. A moral rape is therefore committed by a digital or speculum examination, and two lesions will be found, firstly as a matter of course, a virginal anteflection, and secondly, an endometritis. These are at once seized upon as the prime factors, and she is accordingly subjected to a painful, unnerving, and humiliating local treatment. Unimproved, she drags herself from one consulting room to another, until finally in despair she settles down to a sofa in a darkened room and relapses into helpless invalidism.

"The yet-developing nerve centers of this brain-crammed girl were unable to cope with the strain thrown on them and consequently they broke down. But jaded nerves make poor blood and faulty circulation. From these come cerebral and spinal irritation, with headache, backache, and general exhaustion. But since this girl is at an age in which the sexual sphere predominates, the brunt of the nervous and circulatory disturbance falls on the most exacting organs—the reproductive."

Some years ago a young man of medium height, good physical organization and family history, entered the junior class of a normal school after passing a creditable examination. Lessons were assigned and recited, not so much for the purpose of acquiring familiarity with the subjects as to impart and acquire the best methods of teaching. Our friend possessed a good memory, apparently better cultivated than his judgment. He worked diligently, but not more so than many others of his class. Failing to memorize the long lessons of his text-book, as possibly had been his custom in other schools, he began to worry. More hours were spent in listless attempts at study. The digestion became poor, the muscles wasted, and the slightest emotion caused great fatigue. Headache and neuralgic pains, comparatively unknown before, became almost constant. His unequal tasks he continued a few months and then went home a pitiable wreck. Several years' rest and of light labor on the farm improved his condition somewhat, but his mental faculties were still impaired, and his constant complaint was "I am tired."

Permit an example from the Detroit public schools. A young lady of strong frame could memorize readily, but as is often the case with such pupils, depended more upon the memory than the judgment. She was what is often termed an apt pupil. For sometime she complained of lassitude—slight exertion caused great fatigue—headache, backache, neuralgia, etc., but these attracted but little attention until insomnia with hallucinations alarmed the friends. She was removed from school, and placed under treatment, but several weeks elapsed before she could be trusted from home without an attendant. The lassitude continued, the physician's prohibition of mental pursuits was disregarded, and the benefits of an asylum for many months sufficed to restore her to her friends and home, a mere wreck of her former self.

These are examples, varying possibly in degree, of what may be found in every school and in many a family. This lassitude is not natural to the young, neither is it well that our noble country should be deprived of so many of its brightest mental jewels.

There are many causes which contribute to nerve-exhaustion in all civilized countries, and more especially this of ours. Everything is done at high-pressure—business, pleasure, fashions, dissipation, etc. There seems no time for rest until worn out by excessive excitement and worry, the grave brings its happy release to these weary mortals.

It would be interesting to trace the influence of heredity, intermarriages, stimulants, and narcotics—alcohol, tea, coffee, tobacco, opium, etc.,—as factors in the causation of nerve-exhaustion; but for want of time the remarks will now be restricted to public schools. Though our public school system is the crowning glory of this Republic, its evils as well as its beauties should be watched with care, that succeeding generations may receive it, not only unmarred, but possessing still greater excellencies.

It is not easy to obtain statistics from the pupils of public schools in regard to the various symptoms of cerebral and nervous exhaustion, for such an investigation would involve answers to questions which might cause offense to both pupils and parents. Much may be inferred from observation and from the number who complain "I am tired." At the beginning of the term, especially in the primary grades, the pupils are full of animation; at its close many complain of weariness, and great fatigue on slight exertion. Some seem completely exhausted when they reach their rooms in the upper stories of our too-high school-houses. This is especially the case with the girls, who do not enjoy so much open-air exercise as the boys. Not a few of them have left school—some by medical advice—in consequence of this excessive weariness.

Now since the schools were formed for the pupils, not the pupils for the schools, their influence in the causation of brain-exhaustion should be known and so far as possible removed. One or more of these causes is readily suggested:

1. The curriculum comprises too great a variety or extent of subjects. In this age when every person of any pretensions is expected to be an encyclopædia, it would be hazardous to advocate a curriculum containing less, even though the happiness or even lives of many children depended upon such a change. After a careful examination of the requirements of various city schools, there

seems to be no just reason why a child of ordinary ability should not perform the work with ease. The trouble probably lies in some other direction.

2. The length of time. In many cities of this country the schools are divided into three departments—Primary, Grammar, and High—to each of which four years' time is assigned, making twelve in all. As the pupils are only prepared to matriculate in the arts department at the university, this seems like a long time and is no doubt a factor in the causation of the evil under consideration. As stated above, the people will not, neither should they, be satisfied with much curtailment of scholastic training. Could the same amount be obtained in less time without materially increasing the risk of injury to the pupils? Most children during the first three years of their lives acquire familiarity with a language and considerable knowledge of many other things, valuable to them in after life. Since all of this is accomplished at so tender an age usually without system, skilled instructors, or material injury to health, it is believed the time at school might be shortened one or more years in each department with material benefit. The whole time for the present curriculum with good teachers and suitable methods of instruction need not exceed eight years instead of twelve as at present.

3. The quality of the instruction. Many books and subjects may be studied by a pupil at school, and when he is done competent judges may fairly question the benefit derived therefrom. Almost everything depends upon the quality not quantity of scholastic training. A few subjects so taught as to be available for practice at all times is worth many volumes memorized simply.

It is believed the teaching of modern times is too superficial or lacks the practical. Children are crammed with definitions, rules, and words of text-books, which under the present methods of instruction are about as intelligible to them as the Sanscrit language. Their memories become overburdened. They strive to recall words of the books and memorize new ones, but failing to keep pace with the class by this method they begin to worry, and nervous prostration soon ensues. The cases already reported furnish painful illustrations.

DISCUSSION.

The subject was further discussed by Dr. Whelan, of Hillsdale. He was in favor of giving children less work, more air, more exercise, and more food. Children needed to eat often, and required a great deal of food. Their growing bodies had to have material to grow on. He said any quantity of children were starving to death in this land of plenty through a mistaken idea as to their needs

Dr. Chase, of Otsego, said children were sent to school too young.

The next paper was by Prof. Albert B. Prescott, of the University of Michigan, Ann Arbor, on "The Use of Household Filters for Potable Water."

THE USE OF HOUSEHOLD FILTERS FOR POTABLE WATERS.

BY ALBERT B. PRESCOTT.

During the past two years I have instituted repeated investigations as to the value of the portable filters, in very common use for the filtration of rain-water in Ann Arbor, where filtered rain-water is used for drinking and culinary purposes by probably more than half the families. There are various patterns of these filters in use, but in all cases the filtering material is coarsely powdered wood charcoal, usually with intermixture of gravel, and the mechanical support of layers of gravel. The water is strained by passing through a sponge, and then filters through a bed of charcoal-gravel, from 12 to 20 inches in depth. The filtering material is close enough so that, with a horizontal area of 12 to 20 inches diameter, the water does not pass out faster than in a barely continuous stream.

Most of the waters upon which the filters were tried were the rain-water from different cisterns at private houses, the same water drawn upon to be filtered for potable uses. In the greater number of cases these representative samples of rain-water were found to contain too much organic matter to be perfectly wholesome, as the results show, but they were not very bad. Then there were two samples of rain-water, tried in filtration, that were decidedly bad, so that they must have been contaminated by foul cisterns, or foul gutters, or in some way. And, to see what filtration would do in case of extremely bad waters, four samples were made impure by addition of urine. One sample of well-water (found not very good), and one of spring-water (found fairly good), were also taken, for trial of the filters.

The determinations were made by a chemical analysis of the water before filtration, and exactly the same chemical analysis after filtration. The impurity chiefly considered was that of organic matter, or, more definitely, the most putrescible organic matter, that of nitrogenous composition. This was determined by Wanklyn's process, as "albuminoid ammonia," and "free ammonia."* In ten of the comparative trials, the total residue at 212° F., the residue after ignition, with resulting loss by ignition, and the proportion of chlorides, were also determined. Tidy's "oxygen method" of determining organic matter was also tried, in comparison with Wanklyn's "ammonia-process," upon five samples of water, both before and after filtration. In all, twenty-seven different samples of water were subjected to analysis, each before and after filtration.†

It may be now stated, in advance of the tabulated details and of explanations, that the investigation sustains the following *practical conclusions:*

First. A good portable charcoal filter, such as described, when in good order, removes from eighty to ninety per cent of the putrescible organic matter, from rain-water.

Second. Such a filter, in good order, supplied with unpolluted rain water, collected and stored with due cleanliness, and with strictest exclusion of ground drainage, furnishes a very pure water (containing an average of only three-tenths and at most seven-tenths of the maximum safe quantity of nitrogenous organic matter.)

Third. A good filter, in good order, cannot be at all depended upon to make polluted water safe for drinking. (Any water containing the free ammonia found in filtered waters Nos. 5 to 10, especially with the albuminoid ammonia of Nos. 5 and 6, would be rejected by a chemist as unsafe.) A polluted water, probably containing animal excreta, is liable to carry specific poison, as that of typhoid, and no filtration can be at all trusted to make it safe.

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* Wanklyn's method continues to be sustained as a useful practical measure of the wholesomeness of water. It does not represent the whole of the nitrogen of all organic substances; but for any given substances, it is an accurate index of their increase or diminution, and for comparison of the same water, before and after filtration, it is an admirable method. As to Frankland's method for the determination of nitrogen and carbon, it seems to be impossible to know how much dissociation of putrefactive matter will occur in the evaporation to dryness, even with the precautions taken. The trial here made of Tidy's new "oxygen process," mentioned in this report, did not at all satisfy us of its value.

† These analyses were executed, under the writer's direction, by Messrs. E. M. Reed, Theo. Hauck, A. H. Vandivert, and B. F. Dawson,—all then students of the School of Pharmacy of the University of Michigan, and all now graduates of the same. Messrs. Reed and Hauck made the first ten double analyses, with determinations of residues before and after ignition, and of chlorides. Their results are reported in the Chemical News, London, xxxvii., 107 (March 15, 1878); also, in part, in Michigan Medical News, Aug. 10, 1878. The last fifteen double analyses, with trial of Tidy's process upon five of the same, were done by Messrs. Vandivert and Dawson, in 1879, and not hitherto published. I wish to testify to the fidelity of each of these analysts. In the ammonia-process, the most rigid precautions were used to exclude atmospheric ammonia. Distilled water was made ammonia free, and blank determinations carried to insure freedom from interference.

Fourth. In case of any potable water not decidedly bad and yet containing such traces of organic matter as to make its use of doubtful safety, the danger from its use is very greatly lessened by its filtration through a good filter, in good order.

Fifth. A good charcoal filter, used for clean rain-water, and *not kept submerged* over half or two-thirds of the time, but left with the filter-bed drained off a part of every day, will remain in good order for considerable time, and may be relied upon for at least a year. Air is far better than the purest water to cleanse a good charcoal filter. The better the filter, the more readily is it cleansed of organic matter by atmospheric oxidation. Due care of a filter requires that all suspended matters should be removed before the water reaches the filter-bed. This is well accomplished by the sponge interposed between the reservoir of unfiltered water and the bed. Of course water that is loaded with impurities (especially dissolved impurities) will far sooner clog a filter-bed and make it worthless. It is only when supplied with approximately pure water that the slight organic residues can be removed by atmospheric oxidation, and the filter be considered an almost permanent means of purification.

Sixth. Water should not be stored after it is filtered. Filtered water is like the manna of the Hebrews; it must be obtained fresh every day. Organic growths, algæ, multiply in even pure water. These bodies are highly nitrogenous; perhaps taking nitrogen from the air; and they should be removed. Filtration does it.

FILTRATION includes three distinct operations:

First,—Straining. The mechanical removal of solid particles, suspended in the water. It is these that, when abundant enough, render water turbid, or cloudy, and that are deposited by standing in perfect quiet, as in the sedimentation of waters for cities. Filtration upward is sometimes adopted, to obtain sedimentation in the filter without clogging the filter-bed. But a finely porous septum, such as sponge, effectually removes all solid particles. In the use of rain-water, it is a great advantage if at least some degree of straining, the closer the better, can be effected before the water enters the cistern. By straining is usually meant the removal of solid particles large enough to make some degree of cloudiness,—particles large enough to be seen by the unaided eye or with a hand magnifyer. Microscopic particles are not removed by ordinary straining; though they are, in greater part, by a good filter.

Second,—Adhesion. The retention of dissolved matters in the filter-bed. A solution of organic coloring matters, though so perfectly free from suspended solids as to show no particles under a microscope, when passed through certain porous substances, leaves the coloring matter behind. The capillary attraction of the porous surfaces for the dissolved solids takes them out of solution. Dissolved gases are to some extent withdrawn from solution in the same way. The more minutely porous a filter-bed is, the more efficiently it removes organic matter from water. The best filter-bed for this purpose is bone charcoal, perhaps the next best is wood charcoal. But whatever the material, it should be so disposed that the water must all be subjected to capillary attraction, as long as possible, in going through the bed. If there are interstices, so as to permit currents of water, just so much of the water fails to be filtered. And the retention of dissolved solids depends upon finer pores than are needed to take out suspended particles. A good filter-bed must be fine and close enough, so that at any given point the liquid does not pass through faster than by drops; and if, in a section of the bed, of two inches diameter, the water does not pass faster than five to twenty drops in a minute, so much the better.

Filters of bone charcoal, in large fragments, put in a box which is sunk in water and from which water is drawn out, have been tried for public water supplies, and have been found to remove far less organic matter than we find these wood charcoal and gravel filters to do. Of course the close filter-bed works too slowly for ready adaptation to public water. The filter-beds used in these experiments are stated to contain about one volume of gravel to three volumes of charcoal. But the result is governed largely by the degree of fineness and compactness. The structure of the bed must be even, so that no channels can be made, and then the rate of flow is the criterion of suitable fineness and compactness. A bed of sand, it has been found, does but little more than remove suspended matters, including organic growths too fine and too light to be removed by sedimentation. The sand particles are not porous, and their surfaces have weak adhesive attraction.

Third,—Oxidation. It has been stated, for some years past, that the organic matters withdrawn from water by a filter-bed are to a degree oxidized away by the air, so that the filter-bed does not clog up. The analyses here submitted, showing the efficiency of filter-beds long in use, prove that a great deal of oxidation of organic matter must have occurred. Otherwise, as is often assumed, the filter-beds would soon get saturated with the organic matter, and then do as much or more harm than good. For No. 1, the filter, which was small, had been in use, for two or three pails of water each day, for eight months; for No. 2, the filter had been longer in use; Numbers 13 to 19, inclusive, were filters which had been some time in use in families, and No. 25 *b* had been in use two years. Yet the efficiency of these filters was found not very much lower than that of the new filters used for Nos. 3, 5, 10, and 11. The filters which had been in use and kept filled and covered with water constantly, did the poorest work, viz., Nos. 4, 12, and 20; notably No. 4, though it had been in use only four months. Also, No. 24 *b*, a charcoal cistern filter, long submerged, only removed twenty-seven per cent of the matter indexed as albuminoid ammonia. Filter-beds need the air to be let through them every day for due exercise of atmospheric oxidation. And it is by this, here named as the third function of filtration, that household filters with charcoal beds become practically useful in purifying water.*

The results of the analyses may be tabulated as below:

		The Filter.	The Water.
No.	1,	of 8 mos. service, *aired daily*	Cistern rain-water.
"	2,	of long " " "	Well-water.
"	3,	new	Spring-water.
"	4,	of 2 mos. service, *submerged*	Barrel rain-water.
"	5,	new	Rain-water, with urine.
"	6,	"	" " " "
"	7,	"	" " " "
"	8,	"	" " " "
"	9,	"	" " " "
"	10,	"	" " " "
"	11,	"	Cistern rain-water.

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* Oxidation in the filter-bed illustrates a common and important fact in nature. The oxygen, condensed by adhesion in the pores, is extra active. Spongy platinum causes a stream of hydrogen to take fire in the air. Freshly ignited charcoal causes hydrosulphuric acid gas to take fire in oxygen. Dry earth, as used for the closet, Col. Waring says, when exposed months to the air, can be used to take up fæcal matter repeatedly, without gaining in proportion of organic matter, as verified by analysis. Purification by atmospheric oxidation, is nature's great means of cleansing rivers; in this case being done in a swift running current; and very rapidly in water spray.

The Filter.	The Water.
No. 12, in household use, *submerged*	Cistern rain-water.
“ 13, “ “ “ *aired*	“ “ “
“ 14, “ “ “ “	“ “ “
“ 15, “ “ “ “	“ “ “
“ 16, “ “ “ “	“ “ “
“ 17, “ “ “ “	“ “ “
“ 18, “ “ “ “	“ “ “
“ 19, “ “ “ “	“ “ “
“ 20, “ “ “ *submerged*	“ “ “
“ 21, “ “ “ *aired*	“ “ “
“ 22, “ “ “ “	“ “ “
“ 23, “ “ “ “	“ “ “
“ 24*a*, one foot of gravel	Rain-water.
“ 24*b*, a charcoal cistern filter, *submerged*	Filtrate of 24*a*.
“ 25*a*, a brick wall in cistern	Cistern rain-water.
“ 25*b*, of 2 years use. *aired*	Filtrate of 25*a*.

“ALBUMINOID AMMONIA,” REPRESENTING PUTRESCIBLE MATTER.

Number of parts in one million parts of water.

Less than 0.05, indicates very pure water.
Over 0.10, the water is to be suspected.
Over 0.15, the water is to be condemned absolutely.

Waters.	Before Filtering.	After Filtering.	Removed by Filtering.
No. 1	0.30	0.01	96 per cent.
“ 2	0.14	0.06	57 “ “
“ 3	0.07	0.07	0 “ “
“ 4	1.14	0.57	50 “ “
“ 5	1.90	0.10	94 “ “
“ 6	0.40	0.10	75 “ “
“ 7	0.50	0.03	94 “ “
“ 8	0.38	0.06	84 “ “
“ 9	0.30	0.04	86 “ “
“ 10	0.06	0.01	83 “ “
Average of first ten	-----	-----	72 “ “
No. 11	0.204	0.015	92 “ “
“ 12	0.184	0.034	82 “ “
“ 13	0.090	0.009	90 “ “
“ 14	0.365	0.069	81 “ “
“ 15	0.216	0.036	83 “ “
“ 16	Av. of five, 0.212	0.025	88 “ “
“ 17		0.031	85 “ “
“ 18		0.032	85 “ “
“ 19		0.028	87 “ “
“ 20		0.037	83 “ “
Average of second ten	-----	0.032	86 “ “
No. 21	0.180	0.032	82 “ “
“ 22	0.270	0.010	93 “ “
“ 23	0.300	0.040	87 “ “
Average of three	0.250	0.027	87 “ “
No. 24*a*	0.230	0.110	52 “ “

Waters.	Before Filtering.	After Filtering.	Removed by Filtering.
No. 24*b*	0.110	0.080	27 per cent.
" 25*a*	0.250	0.230	10 " "
" 25*b*	0.230	0.070	66 " "

As "albuminoid ammonia" is the best of the measures of putrescible organic matter, it is interesting to see in what instances it was found as high as the danger-limit of 0.10 part per million, in *filtered* waters. These are the only instances, out of the twenty-seven experiments:

No. 4, water fearfully contaminated in some way, probably by accumulations in a water-barrel, with a filter kept constantly water-logged.

No. 5, polluted rain-water, nearly purified of putrescible matter, by a new filter, but still loaded with products resulting from previous putrefaction, as seen by the enormous "free ammonia", in next table.

No. 6, like No. 5.

No. 24*a*. Leached through a layer of gravel only.

No. 25*a*. Filtered through a two-inch brick wall.

"FREE AMMONIA," A SECONDARY RESULT OF ORGANIC MATTER.

Number of parts in one million parts of water.

Over 0.08 is an indication of questionable purity, and in case of well-water, points to cess-pool or sewage contamination.

Waters.	Before Filtering.	After Filtering.	Removed by Filtering.	
No. 1	0.50	0.070	0.430 or	86 per cent.
" 2	0.08	0.020	0.060 "	75 " "
" 3	0.05	0.008	0.042 "	84 " "
" 4	1.34	0.140	1.200 "	89 " "
" 5	33.00	8.100	24.900 "	75 " "
" 6	4.00	0.400	3.600 "	90 " "
" 7	2.50	0.080	2.420 "	96 " "
" 8	4.06	0.620	3.440 "	84 " "
" 9	1.94	0.420	1.520 "	78 " "
" 10	1.08	0.180	0.900 "	83 " "
Average of first ten numbers	----	-----	-----	84 " "
No. 11	1.211	0.084	----	93 " "
" 12	1.123	0.246	-----	78 " "
" 13	0.943	0.114	-----	88 " "
" 14	1.145	0.172	-----	85 " "
" 15	1.342	0.082	-----	94 " "
" 16	Av. of five, 1.153	0.093	-----	92 " "
" 17		0.132	-----	88 " "
" 18		0.219	-----	81 " "
" 19		0.081	-----	93 " "
" 20		0.252	-----	79 " "
Average of second ten Nos.	-----	0.155	-----	87 " "
No. 21	0.560	0.120	-----	79 " "
" 22	0.530	0.090	-----	83 " "
" 23	0.570	0.130	-----	77 " "
Average of three	0.553	0.113	-----	80 " "
No. 24*a*	0.540	0.270	-----	50 " "
" 24*b*	0.270	0.190	-----	29 " "
" 25*a*	0.510	0.460	-----	9 " "
" 25*b*	0.460	0.095	-----	79 " "

These results indicate that charcoal filtration removes ammonia, and the crystalloid substance, urea, as efficiently as it removes the colloid bodies indexed as "albuminoid ammonia." In the distillation with addition of potassium hydrate, urea is chiefly converted into ammonia; while it is not obtained as "albuminoid ammonia", by the action of permanganate, in Wanklyn's process. The polluted waters, Nos. 4 to 10, show a large percentage of removal of "free ammonia", although filtration does not purify them to an extent at all warranting their use. No. 5, loaded with urine, and showing the conversion of urea into "free ammonia" by the enormous proportion of 33.00 parts per million, so overpowered the cleansing power of a new filter as to leave 8.100 parts of "free ammonia" per million parts of water, after filtration.

The proportion of "free ammonia" in the filtered rain-waters is in general so large as to suggest that ammonia may result from atmospheric oxidation of organic matter in the filter-bed. I have had in view some determinations for nitric acid as a result of such oxidation, but have as yet obtained no results suitable for report. The submerged filter-beds, Nos. 4, 12, and 20, removed "free ammonia" to a fair extent,—though less than an average in case of the last two named.

Of the good filters, in good order (or having air let into the filter-beds), Nos. 13, 14, 17, 18, 21, and 23, fail to remove the "free ammonia" as fully as they ought to do, all these leaving over 0.09 parts per million. But as these all give, of "albuminoid ammonia", the chief test of purity, less than 0.07 parts (all but one, less than 0.05 parts), the filtered waters may perhaps be accepted as safe.

Some analyses of various waters at home and abroad may be here presented for comparisons:

	Parts per Million.	
	Free Ammonia.	Albuminoid Ammonia.
Town water, Manchester, England	0.01	0.07
" " Glasgow, Scotland	0.00	0.08
" " Chelmsford, England	0.08	0.02
" " London, Lambeth Co.	0.01	0.16
Thames river, London Bridge, at two hours' flood	1.76	0.35
Thames, above Hampton Court*	0.04	0.28
Springfield, Mass., Town water†	0.09	0.28
The same, sand-filtered	0.07	0.23
Poughkeepsie, N. Y., river water	0.11	0.20
The same, sand-filtered	0.08	0.14

The *absolute quantities* of impurities may be more readily compared with various standards, if I give the *equivalent of "parts per million"*, for some of the results, *in "Grains per Gallon", as follows:*

	"Albuminoid Ammonia."	
	Before Filtering.	After Filtering
Average of Nos. 11 to 15	0.012363	0.001924
" " Nos. 11 to 20	--------	0.001866
" " Nos. 21 to 23	0.014579	0.001592

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* This and the previous five water analyses, from Wanklyn's Water Analysis.

† This and the following four water analyses, from Prof. Wm. Ripley Nichols, Mass. State Board of Health, Ninth Yearly Report.

	"Free Ammonia." Before Filtering.	"Free Ammonia." After Filtering.
Average of Nos. 11 to 15	0.067240	0.008164
" " Nos. 11 to 20	--------	0.008631
" " Nos. 21 to 23	0.03224	0.006607

The results obtained in Total Residue, and Residue after Ignition, are here given, as being data commonly furnished. They are of no real value regarding organic matter,—as the loss by ignition is due to many things beside destruction of organic matter. The Residue after Ignition, as lessened by filtration, is of more interest regarding any effect of filtering upon the *mineral constituents.*

Grains of Residue left from one Gallon of Water.

	AT 100° C.			AFTER IGNITION.			
	Before Filtering.	After Filtering.	Difference, Per Ct.	Before Filtering.	After Filtering.	Difference, Per Ct.	Difference by Ignition.
No. 1	24.556	11.265	54	10.526	10.101	4	12.866, or 91 per ct. less.
" 2	119.274	102.343	14	87.362	85.141	2	14.710, or 46 per ct. less.
" 3	82.432	81.876	0.6	33.322	31.926	4	0.840, or 2 per ct. more.
" 4	35.084	30.243	13	3.508	2.836	19	4.169, or 13 per ct. less.
" 5	222.723	197.226	11	106.997	76.385	29	5.115, or 4 per ct. more.
" 6	199.952	156.107	21	73.662	70.263	4	40.446, or 32 per ct. less.
" 7	197.693	141.826	28	86.915	83.715	3	52.677, or 47 per ct. less.
" 8	181.273	150.194	17	63.781	59.624	6	26.922, or 23 per ct. less.
" 9	110.963	97.852	12	64.876	41.973	35	9.828, or 21 per ct. more.
" 10	102.837	89.651	13	71.139	55.851	21	2.102, or 6 per ct. more.
Mean	--------	--------	18	--------	--------	13	13.390, or 22 per ct. more.

As a matter of course any removal or addition of mineral constituents of water, in filtration, must cease after a time, in continued use of a filter not changed. If some salts are deposited, the filter will become saturated with these salts; if some salts are imparted, the filter will become exhausted of these. In general, a charcoal-gravel filter will not affect the mineral constituents in a notable degree, or to have any practical influence upon the value of the water. It is a matter of some doubt, I believe, whether "soft water", destitute of earthy salts, is as wholesome a drink as water with some "hardness." I am myself inclined to believe (though desiring more evidence), that earthy bases are sufficiently supplied by our solid food, and need not be taken in our drink. It is true, no doubt, that many of us, especially during growth and dentition, suffer from lack of phosphates. But I think it the acid, not the base of phosphates, that is deficient, and we do not look to any water for phosphoric acid. If it is desirable to add any mineral constituents to drinking-water, this could easily be done by an occasional addition to the filter-bed.

As to the importance of the drinking-water, the present writer has no need to make a plea. The well in the door-yard does not always furnish the wholesome beverage, that has been its traditional reputation. The danger of underground drainage is now well demonstrated. Not only liquids but gases, and poisonous gases circulate through the soil, as has been proved by Pettenkofer. the German scientist, in a startling array of facts, presented a few years back, The yearly reports of the Michigan State Board of Health prove it. Fearful destruction in families, and devastating typhoid endemics in various quarters have attested it. The insufficiency of the soil to purify all the water that comes from it, and to cut off all the currents of filth that go into it, has been demonstrated by experiments given at this meeting by a colleague, whose work I know to be admirably done. It has been the householder's practice in Scotland, said Prof. MacAdam, a few years ago, after building his house, to dig two holes in the door-yard, one for a well and one for a cess-pool. So it has been in America. Not only the well, but even the cistern, by overflow-pipes and leakages, has been contaminated by drainage. That some resource for wholesome water may always be at command, in the present prudent distrust of previous water-supplies, the writer offers these results as to household filtered waters.

A vote of thanks was tendered Dr. Prescott for his interesting and practical paper.

Dr. John S. Billings, U. S. A., President of the American Public Health Association, and Vice-President of the National Board of Health, was introduced. He spoke as follows:

REMARKS.

BY JOHN S. BILLINGS, SURGEON U. S. ARMY.

Mr. President, Ladies and Gentlemen.—The first intimation that I had that any paper was expected of me on this occasion was about two hours ago. I arrived in the city about 3 o'clock this morning, and had had nothing in my instructions stating anything about preparing a paper. My directions were to come here, attend the convention, listen to all that was said, get all the information I could, and report the same. So I have no paper, but I will say a word or two. The first is concerning the interest which is taken by the army surgeon in all matters of public hygiene. It is the peculiar business of the army physician to make himself familiar with hygienic work. This has been realized by the army medical department, and for the last 15 years it has been making a special study of these matters, inducing its officers to do the same, furnishing them with books and publications bearing on the subject, and endeavoring to collect information as to all that was being done in the way of improvements for taking care of the health of masses or individuals. Incidentally I will mention, as one of the things which the army is doing for sanitarians, that we are endeavoring to make not only a complete collection of of all that has ever been written on the subject in the way of books, magazines, etc., but to prepare a complete index to all the literature bearing on sanitary matters, which will form a part of the catalogue of the library in the surgeon-general's office.

We ought, all of us, to have a great interest in these efforts to popularize hygiene, and to get people interested in the matter. It is not possible in a community for any man by himself to secure pure air, nor in very many cases pure water, nor always pure and wholesome food. In order to provide these things a certain community of work is necessary. People must join together and help. Hence arises the necessity for public hygiene, and for some laws regulating the matter. The nature of these laws, and the possibility of getting good ones, which will insure a reasonable amount of protection to the public health, without interfering too much with other interests of the people, with education, or with commerce, depend upon the state of public opinion, and on the amount of knowledge possessed by the public. We cannot have the same laws in relation to hygiene in one part of this country that we have in another. The laws of Massachusetts could not be enforced in Michigan, because the people would not appreciate them. The people must be educated up to their necessity. A sanitary law which cannot be enforced, which is backed by no public opinion, is worse than no law at all.

Precisely the same thing which I have said with regard to individual inability to secure the best sanitary conditions, applies also to cities and to States. All must join together, all must help. The necessity arises therefore not only for municipal sanitary legislation, but for state and national laws on the subject. In these efforts to popularize hygiene among the people, and to get them to understand what the sanitarians are really seeking to accomplish, what all this call for pure air, pure water, good food, and the proper care for school children, etc., means, we must be very careful not to exaggerate matters.

When I entered the hall this morning, they were just beginning to read some papers on ventilation. That is a subject which I have had occasion to pay a good deal of attention to. I have had to devise plans of ventilation for institutions large and small, assembly halls, hospitals, etc., and hence I venture to say a word or two with regard to this matter. I inferred that one of the gentlemen supposed the dangerous thing in the atmosphere of a room is the carbonic acid gas, and that it falls to the floor, being heavy, and therefore must be disposed of there. The argument was made that children may possibly be injured because they are shorter than grown people, and breathe more carbonic acid gas. I have heard a great deal about this, and I have actually seen in hospitals at Amsterdam and in Manchester holes made in the side of the wall, covered with valves, where they proposed to let the carbonic acid gas run out when it accumulated too much. As a matter of fact, carbonic acid gas, in the proportions in which it is present in the most crowded assembly, is not dangerous, and not unpleasant. Think of the condition of the atmosphere in one of our mineral-water bottling establishments, where the proportion of carbonic acid gas will reach two per cent; or the condition of the atmosphere in the baths of the carbonic health springs, such as the Sweet Springs of Virginia; you can see for yourselves that certainly there can be very little danger from carbonic acid gas in ordinary proportions. The only thing of interest about carbonic acid gas in connection with ventilation is that it is a measure of other and really dangerous impurities, impurities organic in character, partly gaseous, partly highly complex ammonias, and actual particles of matter derived from the lungs and skin. Carbonic acid gas rises from the floor and is equally diffused throughout the room; the proportion is precisely the same at the ceiling that it is at the floor; even a little greater at the ceiling if the current is rapid. This depends upon the law of the diffusion of gases. I have had the matter very carefully tested at the hall of the house of representatives at Washington, and had analyses made, which are, however, repetitions of many other experiments made upon this subject. The organic impurities in the air are the real source of danger, and are what we wish to get rid of by ventilation. Perfect ventilation should sweep those impurities away as fast as they are formed. The object to be attained is to so arrange matters that no man will breathe any of the air which his neighbors have breathed. That degree of perfection is very rarely attained; it is very rarely even sought for by architects or engineers. What is attempted is to get a certain amount of the foul air out, and to keep the amount of impurities in the air down to a certain standard. That standard is measured by the amount of carbonic acid in the air, for the reason that we have no satisfactory means of determining the quantity or quality of the organic matter in the air. Prof. Remsen, of the Johns Hopkins University, has been at work upon this subject of the analysis of organic matter in the air, and we hope to obtain some results in that direction. At present there is no satisfactory process, consequently we use the amount of carbonic acid as a test of the amount of impurity, and that is the only way in which it comes to be of any importance in the question of the ventilation of our living and assembly rooms.

I have said that perfect ventilation is an arrangement by which no man should breathe any air that has immediately before been inside his lungs or those of his neighbor. In order to effect that in an assembly-room where people are scattered over the floor, as they are in this hall and in legislative halls, a moment's reflection will teach you that the air must either move directly up or directly down. It must not blow across from one side of the hall to the other, for then the persons on one side would breathe air which has just come from the lungs of persons on the other side of the hall. Horizontal currents then cannot be used to secure perfect ventilation. Wherever they are used you secure only a mixing process, or ventilation by dilution. In the hall of the House of Representatives an attempt has been made to secure perfect ventilation. The air is introduced all over the floor, and passes straight up and out at the ceiling. The amount of air required by this method is very large. In order to secure the proper proportions it requires about one cubic foot of air per second to each person. That only gives a rising current of about half an inch per second. If the air had to be drawn downwards, we should have to use a great deal more; because we should have to overcome the natural tendency of the heated air to rise, for every person on the floor is a little stove, warming the air around him, and with a delicate anemometer you can detect, at a temperature of 50 degrees, a current of air over his head. We should also have difficulty with the gas-jets, because we should be drawing the heated and impure air from them downwards.

The case is altogether different in living-rooms where there are only three or four persons, or in a hospital, where the sides of the room are occupied and the center of the room is free. There you may very well use horizontal currents, because there is very great economy in it. You save an enormous amount heat in that way. When air is coming in heated up to the proper temperature, with the outer atmosphere at say 32°, it takes an enormous amount of fuel if this air passes directly from the floor to the ceiling and thence to the outer air. It is owing to this cost of securing heat that is due the trouble to secure satisfactory ventilation in the great majority of dwelling-houses and in halls and churches. It is a very expensive process. I have had occasion to say before in assemblies of this kind that there are three things you can not have together: those are cheapness, satisfactory heat, and satisfactory ventilation. You can get any two of them together, but not the three at the same time. If you have good heating and ventilation you must pay for them. I have found very frequently, in examining methods of ventilation in large hospitals, both in this country and in Europe, that the air-flues were stopped up. I have found the blowing-fans rusting on their axles and not used as had been designed by the architect or engineer. When I would inquire why, the reply would be, "Because it costs too much. It takes too much coal. We can't afford to burn 50 tons of coal in this hospital to secure ventilation."

It was stated in one of the papers, that the night air was very unhealthy;

more unhealthy in the country than in the city, filled with germs of disease, and so on. But there is no other kind of air to have at night, in the country or the city, whether you let it in directly through the window or indirectly down through the basement and cellar. It is night air, no more or less; and you have to breathe night air.

In conclusion, Mr. President, I wish in behalf of the medical department of the army, in behalf of the sanitarians of the country, of the American Public Health Association, and the National Board of Health, to express the interest of all those bodies in the work that is being done here in Michigan and by the Michigan State Board of Health; and their appreciation of all the good which that organization has done, the influence which it has had upon other State boards of health, and upon the progress of preventive medicine in this country. The National Board of Health owes its existence to one of the Michigan representatives, Mr. McGowan. His attention was called to the matter through communications from the Michigan State Board of Health. The statistical work that has been done by the Board is of very great interest to all sanitarians; and its publications are acting as a stimulus to other parties to attempt to secure a similar amount of correct work. And conventions of this kind, although this has not happened to be the first actually held in point of time—one of a similar character having been held recently in New Jersey—were first proposed here, first planned by the State Board of Health of Michigan. And let us hope that this beginning may be the means of organized effort throughout all the States to insure the proper education of the people as to the value of sanitary science.

On motion of Dr. Lundy the following resolution was unanimously adopted:

Resolved, That the thanks of this convention be and are hereby tendered to Surgeon-General Barnes, of the United States army, for the interest he has taken in the Sanitary Convention, and for his kindness in detailing Dr. Billings to take part in its proceedings.

At the close of Dr. Billings' remarks, Dr. R. C. Kedzie presented the following paper:

THE CITY OF DESTRUCTION.

BY PROF. R. C. KEDZIE, M. D., OF THE STATE AGRICULTURAL COLLEGE, PRESIDENT OF THE STATE BOARD OF HEALTH.

I take it for granted that you are all familiar with the wonderful allegory of John Bunyan—that dream of the tinker in Bedford jail, that will continue to mould the waking thoughts of men till the end of time—"The Pilgrim's Progress from the City of Destruction to the Celestial City." I do not call your attention to the City of Destruction for the purpose of eliciting any new moral truth. With such an array of scholars and theologians before me, I would hardly dare couch a theologic lance or brandish a moral javelin,—but to call your attention to certain sanitary facts and principles connected with this allegory, which may be overlooked in the dazzling light of its religious truth.

If we make a sanitary inspection of this City of Destruction, we shall find that *sanitation* has been almost entirely neglected—streets without sewers, houses without ventilation, and the water-supply so inadequate that a drop of water is sometimes in urgent demand. As a consequence Pilgrim has become *very bilious*, his days are filled with gloomy forebodings, and even night brings no rest or refreshment, for "when the morning was come, they would know how he did, he told them 'worse and worse'"—pretty conclusive evidence of a want of good ventilation.

Indeed the city had reached such a stage in unsanitation that it was threatened with FIRE—the *ultima ratio sanitatis*.

When Pilgrim tried to flee from this ague-smitten place, he fell into a huge mud-hole and like to have drowned in the slough of despond, but Dr. Help pulled him out and explained its formation by saying that all the scum and filth of the surrounding region settled in this place, and thus formed the Slough of Despond. But when Dr. Help went on to explain that there was no help for this mud-hole, he showed that he did not understand the first principles of sanitary science. No one would suppose that 20,000 carloads even of the driest sermons would repair the road at this place and make it fit for travel. Good Dr. Help, put in a 5-foot sewer and see how soon this slough will dry up!

The City of Destruction was a place where the moral tone was low, and as a consequence of this the sanitary condition was bad. Mr. Pilgrim seems never to have fully recovered from its depressing influence until he arrived in the neighborhood of the Delectable Mountains, where the lime-stone formation insured good drainage and the air had plenty of ozone.

This is the hour of the iconoclast, and all things are delivered into his hand. The statues of heroes and martyrs are hurled from their pedestals, and all which the past has garnered that the soul holds noble and grand must be dragged down to the level of the common-place, or else be branded as false. They even say that Pilgrim is a myth, his Progress a mistake, and that there is not, and never was, any City of Destruction. Believe it not. I know there is a City of Destruction, for mine eyes have seen it and my feet have walked its streets!

The Memphis of old—the City of Osiris—stood upon the banks of the mysterious Nile at a point where it commanded its commerce and controlled its navigation. The Memphis of to-day stands upon the banks of a river vaster and more wonderful than the Nile, and controls the commerce of a stream that drains an empire. The city stands upon a bold bluff of 40 to 60 feet, overlooking the Mississippi River. It is the most important commercial point between St. Louis and New Orleans. Its site is good with the single exception of the Bayou Gayoso, a depression which extends some two miles through the heart of the city, and appears like an old branch of the river whose mouth has been filled with silt or deposit from the turbid river-water. In every other respect the site is eligible, and presents very simple problems for the sanitary engineer. Memphis differs greatly from New Orleans in respect to its sanitary problems. The streets of New Orleans are from five to seven feet below the level of the river at high water, and but for the levee along the river bank the streets would often be below water. The drainage of such a city therefore presents a difficult problem. On the other hand, the bluff on which Memphis is built is at least thirty feet above high-water mark; there is ample fall for complete drainage; the sewers themselves can all be made short, with rapid fall, and can discharge the sewage directly into one of the largest rivers in the world, which washes the whole city front with a volume of water too vast for sensible defilement, and which sweeps by the city with a velocity of four miles an hour. Thus a water-park, three miles long and a mile wide, lies before the city to give it room and breathing-space, coolness, and light; and this park is swept clean every hour of the year. What shall prevent Memphis from being one of the healthiest cities of the continent? Who dare call it the City of Destruction?

Disease was once supposed to be a direct visitation from the gods, or the possession of the individual by some evil spirit which exhibited the malevolence of its nature by injuring and torturing the body which afforded it temporary shelter. In all cases the individual was a passive agent; the disease was something which had *befallen* the man, and he was to be cured by incantations and offerings to appease the superior beings. Man had no responsibility in the case, and his only duty was to humbly bow before the inevitable. Something of this idea still lingers in our speech: we often say, "the man *was taken* sick"; we rarely say "he made himself sick."

For moral guilt a Savior has died, and the offer of pardon through his blood is freely made to every penitent soul; but for physical sin no anointed one has poured out his blood in sacrificial atonement. *The body that sinneth it shall die.* The trumpet of the angel of physical retribution forever sounds through the earth summoning us to judgment. Nature has no pity, and mercy is with her a word unspoken and unknown. "The fire burns, the water drowns, the earth buries." Physical law is inflexible and inexorable, and equally inflexible are the laws of sickness and health. Disease comes to us either by inheritance or from our surroundings. By the law of heredity the "sins of the fathers are visited upon the children to the third and fourth generation." By inheritance we receive the constitutional tendency or hereditary taint which controls or modifies many of our diseases. But most of our diseases come from our habits and surroundings, which are more or less completely under our control, and for these we are directly responsible. The prophet of old cried out, "WASH YOU; MAKE YOU CLEAN. If ye be willing and obedient ye shall eat the good of the land, but if ye refuse and rebel, ye shall be devoured by the sword." Nature does not plead or promise, but says with curt emphasis, "BE CLEAN OR DIE." If a people will persist in living in *sanitary dirt*—decomposing organic matter abounding in combined nitrogen—they must pay the penalty by sickness and death. Nature's scales of justice hang in awful libration over the nations, and in the alternative scale pans are suspended PURITY—PESTILENCE. The epidemics which sweep over the earth from time to time are but the executioners of this court of physical justice in permanent session. The hot-bed which brings them into life is decomposing animal matter, and the soil which ripens the dreadful harvest of death is *sanitary dirt.* It is impious to shirk off on God the results of human misdoing.

Let us scan the features and look at the weapons of some of these pitiless executioners.

The Oriental Plague which was known in biblical times as "the pestilence," still has its home amid the squalor and filth of the Mahomedan East. It is the direct outcome of the exceptionally filthy habits of this semi-tropical region. It has a lease of Asia Minor which gives it perpetual possession "to have and to hold all this land"—not "as long as grass grows and water runs"—but as long as filthy fatalism holds her people. So long as these people blindly bow to fate, it will be their fate to bow before the destroyer.

But this fatal indifference to dirt was not confined to the fatalistic East. In the middle ages the Christian church inculcated the doctrine that the soul and the body were in direct antagonism, and that the purification of the soul and growth in spiritual life could only be secured by crucifying the flesh by subjecting the body to every form of discomfort and indignity. Hence rags, filth, and beggary were means of grace. Personal cleanliness and purity, comfortable homes and ventilated houses were the allurements and besetments of the Prince of the power of the air. To be dirty and repulsive was evidence of holiness. The baths of heathen Rome stood before their eyes as awful proof of the close connection between a clean skin and an idolatrous heart. The church had forgotten that grand protest of Paul, "Know ye not that ye are the temple of God, and that the spirit of God dwelleth in you? If any man *defile the temple of God, him shall God destroy.*" Here is an epitome of the history of epidemics condensed into three lines.

We can hardly imagine the filthy condition prevailing among all classes in Europe during the dark ages. Even the rich seldom changed their linen, and more seldom still washed their persons, but endeavored by lavish use of strong perfumes and powerful cosmetics to conceal the odors of a neglected person. Among the lower classes the filth of person, of food, and of habitation was beyond description. Into such lands from time to time swept the pestilence from its Oriental home. So sudden was its onset, so fearful its destructiveness, and so speedily did its victims turn black in putrefactive decomposition, that it was called "the black death," and was everywhere regarded as a direct visitation of offended Deity. Its destructiveness was appalling. With one wave it swept from Constantinople to London, carrying more than one-quarter of the inhabitants of Europe into the grave. Although the plague is naturally a tropical disease, yet it found in London congenial home from year to year till "the great fire" of 1666 burned up the filth of that city and burned out the plague.

Within the past two years, the plague, which is endemic in the foul cities of the Orient, started up like a prairie fire in Turkey, following in the footsteps of desolating war, and threatened once more to sweep through Europe toward the Atlantic, possibly to cross the ocean in some over-crowded emigrant ship to find an Occidental home; but the energetic action of Russia and Austria fenced in the plague by an impassable military quarantine, and the pestilence was stopped for the time at least.

Asiatic Cholera is endemic in filthy India. Its perennial home is the delta of the Ganges. In some part or other of India it prevails every year and all the year. But when some great heathen festival occurs, like the gatherings at Hurdwar on the upper waters of the Ganges, occurring every twelve years, the crowding together of two to three millions in one place, living in utter disregard of all sanitary laws, the cholera there acquires such a concentration and virulence as to project it across a continent and sometimes around the world. It requires a certain intensity of the active causes of diseases usually considered endemic to bring them up to a vigorous epidemic activity, but when such epidemic is once set in motion it may propagate itself in places where much better satitary conditions prevail than at its point of origin. A certain culmination of force is required to produce the seed of any plant; but when once perfected this seed may spring up into life under conditions inadequate to perfect the seed, though it still must find a favoring soil for its development. The thistle seed, though wafted across wide seas, may yet produce a plant after its kind and be a thorny thistle still, but it cannot produce the plant unless it falls into a congenial soil. So the exotic fever-germ fails to produce an epidemic when carried to a sanitary place.

The great religious festivals of the Hindoos occur once in every twelve years, and it is from these gatherings that every great epidemic of Asiatic cholera has sprung. The cholera itself is the baleful shadow of Asian heathenism, and goes forth to stir us up to missionary work by reminding us that if we would keep ourselves, we must keep our antipodal brother also.

Typhus, which has swept unnumbered millions into untimely graves, and has been known as "spotted fever," "putrid fever," "relapsing fever," "the sweating sickness," etc., is now recognized as a filth fever. It is still found in over-crowded and ill-ventilated ships, and hence called ship-fever. It was the destroyer which John Howard found in every prison and jail of Europe, and is still called jail-fever. It may be found wherever human beings are crowded together, and sanitary conditions neglected. It is often aggravated and intensified by want and famine. The most striking illustration in modern times was found in the "famine fever" lately prevailing in the filthy huts of Ireland—a visitation which threatens to again sweep "the green Isle" unless a wise providence on the part of the British government shall ward it off. One who saw these victims of disease and want thus describes their appearance: "They manifested no desire for food, but only for warmth and drink,—pale, cold, listless, and uncomplaining, their bodies already exhaling the odor of the tomb—they silently waited for death."

The *yellow fever* has its home amid the filth of tropical America. It seems to be a disease distinctive of the western world, and though it has been transported to the Eastern Continent, it has never prevailed there to any great extent, but has soon disappeared. The West Indies, the sea coasts of Mexico and of tropical America seem to be the home of yellow fever. The Spanish races of the Western Continent seem to be the special guardians of this disease. It prevails at all times in Cuba, and from this island it is carried in Summer by ships to all our principal seaports. Dr. Van Der Poel stated at Atlanta in a meeting of the National Board of Health that there had not been a month in the hot season for many years when no cases of yellow fever had been found in the hospital at the quarantine grounds in New York. By timely quarantine-regulations and by keeping such sea-ports in good sanitary condition, the disease is localized, and seldom flashes up into an epidemic. But in ports where the sanitary problems are very difficult, as in New Orleans, and where effective quarantine is almost impossible because of the numerous channels by which the small vessels engaged in the tropical fruit-trade may reach the city, it becomes a matter of great difficulty to exclude yellow fever. Once within our borders, the railroad, the steamboat, and the very persons and baggage of those fleeing from the infected city, become means of spreading the fever to other localities, where it may prevail epidemically under favoring unsanitary conditions.

EPIDEMICS ARE FILTH DISEASES.

We thus see that all the great epidemic diseases which scourge mankind originate in filth, and are propagated by filth. Of all forms of filth none are more active than the direct and indirect products of animal life. "Man is a poisonous animal"; his touch brings rottenness. Two oceans of purifiers have been provided for his cleansing; the ocean of air and the ocean of water come to us to cleanse and purify, but they are themselves defiled by the contact, and when once they have done our service, they must forthwith be cast out among the unclean. The daintiest food leaves the foulest residue at last, and even the "human form divine" must some day be hidden away to conceal its loathsomeness. This is not a poetic view of human life, and it labors under the disadvantage of being prosaically true. The very congregating of men in large masses intensifies all the evils of physical existence, and seems to call out others unknown in the solitary life of the country. Where men gather in large cities the conditions of life must be guarded with jealous care to prevent the conditions which favor the development and spread of some pestilence. But when the destroyer unsheathes his sword, it is man in his individual or collective capacity that has called him forth. Human filth is the hot-bed of epidemic diseases, and maintains their existence even where they prevail as endemics; the culmination of filth fans the *endemic* into the *epidemic*. A fire may smoulder for a long time, but it will never spread into a conflagration unless it reaches new fuel, and then a breath may fan it into a flame spreading ruin on every side. All depends upon the surroundings. A glowing spark falling upon shavings will imperil our tinder-box cities; but falling on clean sand will go out in silence. So the fever-germ may be carried a long distance, and falling into some magazine of unsanitation may explode into a frightful epidemic. These fever-nests seem almost to attract the wandering epidemic germ just as the depot of nitroglycerine seems to fascinate the foolhardy hand which shall wake up this bottled earthquake.

Let me again recall your attention to yellow fever, because the sanitary problems of to-day seem to crystalize around this point. Other diseases destroy more lives a hundred-fold, but the public attention for the time is turned to this disease, the need of sanitary reform is most clearly seen in dealing with it, and the sanitation which will banish yellow fever from our land will also prevent a number of other diseases which are more destructive on the whole, though not so dramatic in their surroundings. Yellow Jack on the Gulf, and Yellow John on the Pacific, lead the sanitary and the political problems of the day. You have little sympathy with the hoodlum yell, "Yellow John must go;" but you will all fervently join in the refrain, "Yellow Jack must go!"

I have spoken of yellow fever as exotic, imported into our country, more especially from the West Indies, though it may be brought from any port of tropical America. May not this alien foe apply for letters of naturalization and citizenship in the great Republic? For a long time it was supposed that the fever germ could not hibernate in this country, and that a freezing temperature would effectually eradicate the fever from any district. For these reasons the people anxiously look for frost when the fever prevails, assuming that Jack-frost would banish Yellow Jack at least till a new importation. A few discerning sanitarians doubted the efficacy of frost in the absence of all sanitation, and boldly said that the repeated importation and prevalence of the fever year after year in such a city as New Orleans, had made the disease endemic in that locality, and that in the absence of sanitary measures it might spread from such a city in epidemic form to other parts of the country. Some held that the fever can never prevail at an elevation of 600 feet above sea level, and that there was a certain limit of temperature below which the fever could not spread.

SHOT-GUN QUARANTINE.

When yellow fever prevails epidemically in any city, the mass of the inhabitants seem to become insane with dread of the disease, and the people of the surrounding country soon seem to become equally insane with fear lest the fleeing citizens spread the disease in their neighborhood. The result often is that a shot-gun quarantine is soon established against the smitten city—armed men guarding all modes of egress, ready to shoot down any one who persists in his attempt to escape. Even women and helpless children are thus fenced in to this plague-smitten spot by the pitiless and cowardly hand of mob violence, the sick and the well being shut up to one common danger. It becomes literally true of such a city, "Without were fightings, within were fears." At the first out-break of an epidemic of fever, therefore, the citizens are frantic to flee before every avenue of escape is closed by the hand of violence. From the infected city, therefore, all classes rush forth in disorderly flight, with three noble exceptions—the physicians, the clergy, and the nurses—those white-robed angels of mercy.

Perhaps some of you may feel a contemptuous pity for persons thus frightened out of their wits; but a Texan doctor who had long been familiar with the disease said to me, "It is no mark of cowardice, but it is every one's duty to be afraid of the yellow fever."

I presume that you are not familiar with yellow fever, and only picture it to yourselves as some disagreeable and dangerous disease. Let me sketch a few lines of the picture and leave your imagination to fill in the details. When the fever breaks out in a city it usually begins at one or more points and spreads from such center in a slowly receding wave which moves outward at the rate of about 200 feet a day. The eye does not see it and no human sense can mark its progress, but the line along which the stems are falling shows where the invisible scythe is passing. The inhabitants of a whole block may be smitten down in a single night, while, as yet, no mark of it is seen in contiguous blocks. Behind this wave-line are delirium and death; before it, heroic fortitude or wild despair. Thus the destroyer moves leisurely forward.

Let us trace the successive stages of some one patient; first he is suddenly seized with a deadly chill, which threatens to throttle its victim; the minutes of shivering agony stretch out to hours, but at last the reaction comes; the vital heat which has sunk down—down towards death—at last rallies and the bodily temperature rises to normal heat, then passes on to 101°—to 102°—to 103°, when the doctor looks anxious—to 104°, when he gloomily shakes his head—to 105°, when hope ceases—to 106°, when death is certain. The patient has passed from the stupor of the chill to the wild delirium of the fever; the skin becomes a ghastly yellow or dusky brown; blood-spots appear here and there under the skin; the eyes are yellow as gold, blood-shot, heavy, expressionless, unobservant; the mouth is parched; the tongue cracked and bleeding; from the gums exudes a dark-brown, bloody fluid; the mind is heavy and wandering, muttering incoherently perhaps of cooling streams and gushing fountains. More and more irregularly move the wheels of life, and all perception and consciousness seem swallowed up in profound coma, when perhaps the patient suddenly throws up his arms in mortal agony, the dreadful black-vomit bursts from his lips, staining everything it touches with inky blackness, and he sinks back—dead.

"Does death end all?" Certainly not. There remains the funeral. What is the funeral of the yellow-fever dead? Not such as you are accustomed to see, where every possible trace of death is washed away, the features composed, shrouded in white, strewn with flowers, while over the pale face the mourners bend with tender farewells; the prayer and hymn that breathes of hope and immortality, the long and reverent procession, and at last "dust to native dust, ashes to ashes." Far otherwise in a fever epidemic. The awful necessities laid upon the living, the care of the sick and dying, the scanty assistance, the imperative requirement that the dead be speedily buried to prevent further spread of disease, all forbid the observance of customary funeral rites. Do not reproach the grief-stricken and overworked citizen for any want of humanity. As soon as death is certain, with no reverent delay, the body, in all its filth and with the garments it last wore, still warm with remains of life, is seized by some hired grave-digger, thrust into a coffin, hurried into some cart and "toted" off to the grave-yard, and when its turn comes is dumped into its grave and covered from sight forever. "Mud to mud" would close the fitting burial service. Death is terrible; such a death and burial are horrible!

EPIDEMIC OF 1878.

The summer and autumn of 1878 was almost tropical in character in the southern and middle States, and the advent of cold weather was nearly six weeks later than usual. Yellow fever had prevailed for some time in New Orleans and the fever was brought to Memphis. It was well known that the city was in a very unsanitary condition, because Dr. R. W. Mitchell, the city health officer, had made a report to the common council calling attention of the city fathers to the dangerous and unsanitary condition of the city and urging the authorities to place the city in condition to avoid the pestilence; but the council refused to do anything and Dr. Mitchell resigned. Ere long a few cases of fever of very suspicious character appeared, but it was called by some milder name and the danger for the time averted! A rumor was afloat that there was yellow fever in the city, but this was denied with some warmth by city officials, and strenuous efforts were made to conceal the very existence of fever "lest it might injure trade and produce a panic among the citizens." But the fever spread with such rapidity and so clearly manifested its true character that concealment was no longer possible. When once it became known that yellow fever had prevailed in the city for many days, that it was spreading rapidly, was very malignant in character, and that the city officials had willfully deceived and misled the people, the rebound was awful. A panic seized the mass of the citizens who sought to flee in any and every way from the infected city. Every social tie seemed to dissolve in an hour; friendship and kinship counted for nothing. The husband and father forsook wife and children. Men rushed to steamboats, to railways, to every means of escape. At the depots they fought with each other like wild beasts to secure tickets and places in departing trains. *The pilgrims were leaving the City of Destruction,* not singly or in groups, but by thousands. Such scenes occurred day after day till 25,000 had fled from the doomed city. Then came the shot-gun quarantine when further escape was impossible. Of the 20,000 who remained in Memphis who were "unprotected" (who never had the fever) more than 17,000 contracted the disease, and these died by thousands. For months the sultry tropical atmosphere hung like a pall over the city; the very rains did not fall like the cooling benediction of the sky, but rather like the scalding tears of nature Niobe-like weeping over her untimely dead. The slow-footed hours dragged on while swift-winged disease flitted on every side. After long weeks of watching at last there

> "Fell the frost from the clear cold heavens,"

and Memphis was safe—the pilgrims could return.

One would suppose that a city thus visited would need no second admonition. Nature had opened her two tables of sanitary law—the shortest code ever written: *Clean up! Clear out!*

What would Memphians do? There was much talk but little scrubbing. A meeting was called in Memphis, last April, of representatives of State and city boards of health to consider this subject in its relations to the safety of the valley of the Mississippi. We met and organized the Sanitary Council of the Mississippi Valley. We found that Memphis had practically done nothing to ward off another epidemic of fever. The citizens claimed that "there had been heavy and protracted frosts which must have destroyed all fever-germs in Memphis, and we are safe unless the fever is again imported; besides this, the fever never comes in two consecutive years." We found the city honeycombed with privy-vaults, often in dangerous proximity to the domestic water-supply, and sometimes in the cellars of inhabited houses; disused wells put to a use that is not well; the Bayou Gayoso running through the heart of the city was a stagnant stream and offensive to the nostrils even in April; in it were cats that had surrendered their nine lives, and dogs that had given up the canine ghost,—in short it served as an open sewer and catch-all of an ill-kept neighborhood; many of the houses had no under-floor ventilation; the houses in which the fever had prevailed had never been thoroughly cleaned, disinfected, and aired, but had been left simply to the purification of frost, the water-works were insufficient, there was no adequate sewer-system, and a worn out and rotten Nicholson pavement poured out a steady stench 13 miles long!

They were urged to purify and disinfect, to drain and ventilate, to set their city in order that they might live. But the city had abandoned its civic organization in order to repudiate its municipal debts, and there was no mode of raising money for sanitary purposes except by individual contributions—a process utterly lacking in that unity and certainty of action requisite for the Augean task of purifying a foul city. Oh, for some Hercules with the river Menios for such cleansing!

With great unanimity the city did nothing. When the warm weather came on they felt safe because no fever had appeared at New Orleans, which was supposed to be the picket-line of danger. After a time the papers announced two cases of yellow-fever in Memphis, breaking out in the quarter where it had prevailed last year, and with no importation from abroad. This disposed of the theory that yellow fever cannot hibernate in the United States. I telegraphed to Dr. Mitchell for particulars, and received this reply: "Two cases of yellow fever; evidently sporadic; carefully isolated." But the cases multiplied until they were compelled to confess the existence of an epidemic, and to publicly advise the depopulation of the city, when *the pilgrims once more fled from the City of Destruction;* but this time, thanks to the rules and regulations for inland quarantine by the National Board of Health and the Sanitary Council, the shot-gun quarantine was avoided.

I need not rehearse the story of this second epidemic. Dr. Bell of New York, editor of the Sanitarian, spent many weeks in Memphis this Autumn and made a careful personal inspection of its condition. In the late meeting of the American Public Health Association, in Nashville, he publicly said: "It has been my fortune to inspect many foul cities, but Memphis is the foulest of them all; its sanitary condition is simply abominable. I have seen many places made sad and desolate by war and pestilence, but none to move the heart like Memphis, for in all history was never a city so smitten. Her trade and commerce for two years ruined; within these two years more than one-half of her entire population have had the yellow fever, and more than one-sixth part of her entire population have been swept into the grave by the fever. Poor, crushed Memphis! Her city organization gone, a crushing debt overhanging her, not a dollar in her treasury, and without the means of raising a dollar for sanitary purposes, yet requiring a large outlay to save it from being the plague-spot of the great valley."

Yet when the condition of Memphis was thus pointed out, two of her representative men publicly, and with some heat, resented the imputations that had been thrown upon their city. "She has indeed been most unfortunate, but she is one of the cleanest cities on the continent, and to charge her dreadful sickness to her exceptional filth is an outrage upon the fair fame of the City of the Bluffs, and I denounce all such statements here and now." When this defender of Memphis came down from the rostrum I privately asked him whether Dr. Bell had not told the truth about his city—"Certainly! All he said is true, but my people would give me sulphurous mischief if I did not stand up for the good name of my city."

God pity Memphis with such a champion! Must she still be called the City of Destruction, and her purification be by fire?

THE RIGHT OF SUICIDE.

The more we study these sanitary problems and see how disease is in all cases the violation of physical law, the more this conviction comes into prominence, that *no man has any right to die of anything except old age.* When the machine wears out with fair usage, and comes to a final halt, the responsibility rests with the maker rather than the user of such machine. God gave life, and he alone can innocently take back his own gift. How does death by preventable sickness differ from suicide? When a man dies by his own act we call it suicide; does it make any essential difference whether he does this by swallowing arsenic or disease-producing filth? Let us cease to be a race of suicides, and let us die in the way of God's appointment. When the silver cord of spinal nerves is loosed and the golden bowl of the cerebral lobes broken, when the worn pitcher is broken at the fountain and the wheel at the cistern, and thus the worn-out lungs and heart come to final rest, then is it time to come in reverent hope before the bar of Him who has said, Thou shalt not kill.

At the conclusion of his paper, Dr. Kedzie said Dr. Billings had been in Memphis recently and could speak from experience of what he had there seen.

REMARKS BY DR. J. S. BILLINGS, VICE PRESIDENT OF THE NATIONAL BOARD OF HEALTH.

Mr. President,—During the progress of the epidemic in Memphis last Summer I went down to see the authorities just outside of the city, with reference to aid desired by them for the city sick and poor. In lieu of promising the rations asked we promised to make a careful sanitary survey of the city when the epidemic was over, and the work was put in progress as soon as it was safe to begin it. That work was a system of very careful house-to-house inspection, all parts of every house, with the premises, being examined. Without a detailed description of all the nuisances existing, the preliminary result of that inspection was laid before the authorities of Memphis last December. Our report has been published in full in one of the bulletins of the National Board of Health. I presume almost all present are familiar with it. The substance of it was, first that Memphis had a very impure water-supply. It may be said that a majority of the cisterns are impure, being contaminated with leakage from privy-wells. There are several thousand of those privy-wells in the city, many of them being, as Dr. Kedzie has said, in the cellars, sometimes the cistern being not more than six feet away, built with very poor brick and ordinary mortar. The bayou, as was explained, is pre-eminently foul. I will not attempt to repeat the details. The recommendations made were for a system of sewerage, for obtaining a good water-supply, for cleaning out and filling up all the cess-pools and other places where were accumulations of filth, and for getting the pavements in order as fast as they could get funds. That report was accepted. They made a unanimous appeal to the legislature of the State and to the Governor, who called a special session of the legislature. The legislature gave them special power to raise a tax for carrying out the sewerage-plan, and for going on with the other improvements suggested by this survey. They will begin work about the 15th of this month. This last year there were 2,010 cases of the fever in Memphis, and 587 deaths. The history of the yellow fever in the city of Memphis this last year is the same that it is in almost all cities where it is epidemic, viz.: There are first one or two cases in the place; but you hear nothing of the yellow fever for three or four weeks, or five or six weeks. Then suddenly it will appear in a large number of cases at once. Usually you can trace no direct connection between the first two cases and the subsequent ones. The first cases of the yellow fever appeared in Memphis this year on the 23d day of May, and seemed to be connected with the cleaning up a very dirty house. A family of five had occupied this house the previous year and had been sick with yellow fever. The head of the family had died, and the house had not been cleaned during the Winter. Two persons cleared it of rubbish and dirt, and on the 23d of May one of them was taken sick, on the 26th died, and the other was taken sick about the same time. Then nothing more was heard of the fever till about the 8th of July, when the sporadic cases referred to by Dr. Kedzie were reported.

The feeling in the city of Memphis at the present time is very strong. I think that they are going to clean up, raise money and do the best they can. It is a matter of exceeding difficulty for the city to raise funds. It is in debt and has repudiated its debts. The state of Tennessee has also repudiated, and it will only be by three or four of the wealthy citizens advancing the money on this tax-bill that they can raise the money at all. It would not be possible for them to borrow money outside. If they can get $250,000 they can do enough work between now and next May to put the city into reasonably good shape. It will be far from being a clean city, but it will be greatly improved.

Dr. Kedzie and Dr. Billings were thanked by the convention.
A recess was then taken till afternoon.

Fifth Session, Thursday Afternoon, January 8, 1880.

The first paper read in the afternoon was one by G. A. Watkins of Detroit, on Supply of Milk in Cities.

SUPPLY OF MILK IN CITIES.

BY G. A. WATKINS, OF DETROIT, PROPRIETOR OF THE "MODEL DAIRY."

MR. PRESIDENT, LADIES AND GENTLEMEN OF THE SANITARY CONVENTION:—I am not a scientist or a practical chemist, and therefore shall not attempt to give you a scientific lecture on the subject given me, or a chemical analysis of the minute and exact ingredients entering into the composition of pure or impure milk, but will give you a few practical points on the production, care, and use of good milk, together with some of the evils and abuses arising from the sale and use of an impure article, hoping to call the attention of the board of health, the physicians, and the municipal authorities to the necessity of taking measures to prevent the sale of impure, unwholesome milk.

I think I am safe in saying that upon no single article of food is human life so much dependent as it is upon milk. All human beings, the world over, without respect to color or race, rank, caste, or sex, when first opening their eyes to the light of day and finding themselves upon this mundane sphere, go into the milk business unhesitatingly and at once, and follow it faithfully for the first year or more of their busy business life. It is invariably the food of infancy and childhood, and is used largely by many persons through middle-life, and when age comes upon man, and strength is wasting away, and decay and death appear in the near future, knowing by instinct the life-giving properties of the food of his childhood, he almost invariably in his weakness and age goes back to the diet that nourished the life of his early days.

I believe further that the seeds of disease and death are sown amongst children more fatally and more freely through the use of impure milk than any other one agency.

A few years ago I was living in a neighboring city. There then, as here now, there was much competition in the business, and the milk-man who could sell cheapest secured the largest trade.

A disease which baffled the skill of physicians was quite prevalent amongst young children. Some recovered, but many died. Finally by the urgent request of the family physician, the consent of the parents was secured, and the body of a child about three months old who had recently died of the strange disease, was subjected to a *post-mortem* examination. The throat, heart, and lungs were found to be in a healthy condition, but in the mucous membrane or lining of the stomach was found several ounces of a hard dry substance resembling pulverized chalk or fine white clay. The stomach was so highly inflamed as to cause death, and it was decided that the inflammation was the effect of the mineral substance taken into the stomach in adulterated milk. Another examination was made on the body of a child between three and four years old, with a very similar result. The vender had been in the habit of buying his milk at a supply store, the store-keeper of a shipper, and the shipper of farmers, and therefore it was very difficult to ascertain just who the guilty party was.

One case for the adulteration of milk has been before the court in this city during the year past. If I am rightly informed, the man was convicted and fined a nominal sum. The matter received a little attention from the press, a few anonymous articles were written on the subject, no action was taken, and here it ended.

The principal supply of milk for Chicago and several other large cities is brought in from the country on regular milk trains, running in convenient hours, with refrigerator cars, carrying nothing but milk. The amount of milk consumed in this city is not sufficiently large to warrant the running of trains for that purpose. It reaches, however, something like ten thousand gallons per day, and is furnished by three sources of supply. 1st, By shippers who buy of farmers, and ship it in by rail or large wagons, and from their stores here deliver it to consumers; 2d, By producers who have milk farms or dairies near the city; and 3d, By people who keep a few cows in small stables and yards in the city. Just how much of this large supply is pure and wholesome, and how much is adulterated and unfit for use must be left to the consumers to judge. There is no doubt, however, that much of the mortality among children can be set down as resulting from the use of adulterated milk, or what is just as bad, milk made from unwholesome food. The milk that a cow gives is largely determined by the food she eats, and in order to get good wholesome milk you must feed good wholesome food. If you feed swill you must expect swill-milk.

It is very common in cities to see persons acting in the double capacity of garbage-gatherers and milk-venders. Barrels of swill and cans of milk pass your doors daily in the same wagon. These people are very kind and very useful. They take away your kitchen-refuse to-day to accommodate you, and to-morrow they return it to you, as food for your children, having first passed it through a poor filthy bovine distillery called a cow, and thus converted it into pure milk. This innocent economizing in parents may save one or two cents a quart on milk, but in return it brings doctors' bills, disease, and sometimes death. People as a rule pay little or no attention to the source of their supply of milk, whether the venders are honest or responsible or not, whether their premises are filthy or clean, whether their cows are fed on swill-slops and straw, or corn meal and hay, and in fact whether it comes from cows, goats, pumps, or penstocks, only so that it is white, won't sour, and above all is cheap, they will buy it, feed it to their children, and be contented. If their child is extremely strong, and succeeds in keeping soul and body together on the cheap unwholesome food forced upon it by its parents, all is well; and if it is sick they lay it to the resistless ever acting unseen forces of nature, over which no one save the Almighty can have control. If the learned and good family physician has no remedies of sufficient curative powers to extract or counteract poison that is administered every day, and the child's sufferings are ended by death, they bow in broken-hearted submission to the hand of fate, and lay the cause of their affliction to an allwise overruling Providence.

I believe that disease like everything else has its cause, and in cases like this where the cause is not removed, physicians cannot cure and Providence would have to perform a miracle to save.

Is it not high time that parents wake up on this subject and see to it that the milk they feed to their children is at least good enough to be relished by themselves. Milk being nature's diet for children, cannot be supplanted by anything else. No food is healthier if given to them in its purity, and no food is worse than bad milk. Many children, and especially those raised as the old saying is "on bottles," are weakly almost from birth from being compelled to live, or die, on impure milk. Parents say the little darling was never strong, but never once think that its weakness, its sickness, and perhaps its death has been caused by their neglect to furnish it with the pure natural food that its young life requires.

To me this is a matter of serious import, and should receive the most careful attention of every parent and the aid and assistance of our municipal government. We have inspectors of oils, of salt, and of meats, and more necessary than either of these is it that we have an expert inspector of milk, whose duty it should be to constantly inspect the milk that is sold, and also the premises from which the supply is made. I believe, further, that it might be well to require a license of milk-venders, and revoke it if a good article is not sold. With every precaution the only safe way is to use a little business-sense in this matter, and put your supply of milk on the same basis you do that of your groceries and your meats. You don't buy your teas, coffees, and meats of some unknown, irresponsible peddler on the streets, but you usually deal with some one of known responsibility, pay reasonable prices, and expect good goods. You cannot expect to get old Government Java for 10 cents per pound, or fine porterhouse steak for 5, neither must you expect to get good, pure, rich milk from the producer for less than the actual cost of its production, and when the consumer's supposed economy or the competition in business brings the price below a living-rate, the quality is quite sure to be reduced as low as the price.

Many sellers of milk resort to the charity dodge to secure custom, and doing business usually with the ladies, whose sympathies are more easily worked on than those of men, usually succeed. They claim to be poor, have a sick wife and several children to support, keep only a few cows, will bring you nice milk and sell it one cent cheaper than you have been accustomed to paying.

They will carry in your ice in summer, clean your sidewalks in winter, and beg of you to help and encourage them by your patronage. There are many milkmen in and around the city who do a legitimate business and sell good pure milk, but often lose custom by swill-milk and adulterated-milk competition. A few weeks ago several of the leading dealers around the city called a meeting for the purpose of forming an association, whose object should be to see that none but pure, wholesome, unadulterated milk be sold by the members, and to establish and maintain a uniform and remunerative price for the same. The experience of some of the men was, as there related, that what their patrons wanted and must have was cheap milk, and that it would meet the contingencies of the case better to make it cheaper than to make it better, and all on account of competition. The association, however, was partially formed, and work is now being done to interest as many dealers as possible and get the matter in tangible shape. As the business now is carried on, no one can take extreme pains and care in the making of milk, on account of the extremely low price for which it must be sold.

There are other abuses in the use of milk which do not rest on those who furnish the supply, but on the consumers themselves. Many persons living in cities don't know how to take care of good milk after they get it. It is a very common thing to see persons pour new milk into a vessel where the milk of the previous day has been kept, without washing, and then if it sours the milk-man is accused of bringing poor milk. Milk-dishes should be thoroughly washed and scalded, and put away perfectly dry every time they have been used.

It takes from 11 to 17 quarts of milk to raise one quart of cream, but some persons expect a quart of milk to raise sufficient cream for the coffee and oatmeal for a family of half a dozen or more, and as a rule those who take the least complain the most.

Milk to keep sweet and raise cream must have proper temperature, ventilation, and pure air. It is very sensitive and easily tainted, and cannot be kept in close ice-boxes with fruits, meats, or other remnants of the table without soon becoming unfit for use. Atmospheric changes have much to do with souring milk; in heavy damp weather, in Winter or Summer, and during the prevalence of thunder-storms, it is almost impossible to keep milk sweet. The richness of milk is not always a test as to its purity or wholesomeness. Cows fed on the refuse from kitchens may give milk that will raise cream and at the same time be unfit for use and especially for children. Neither is the length of time that milk will keep sweet a test as to its being pure, as in cities where poorest milk is sold it has been found that milk that has passed several hands and is old before reaching the consumer, will keep sweet longer than milk fresh from a cow, which of itself is evidence that it has been doctored to keep it sweet. Many experiments have been tried with different kinds of food for milch cows, but space forbids their enumeration or a detailed mention of the results. Suffice to say that free open air and the grasses and growing feed of Summer are absolutely necessary in their season, and the same kind of feed cured and saved for Winter, with the necessary amount of ground grain, together with a clean, warm, well-ventilated barn, and good regular care, is necessary to the health and contentment of the cow, and the production of good milk. Better results are obtained by feeding on cooked or warm mess in Winter than by even a larger amount of the same food fed cold. In the business of the supply of milk it is easy to point out evils, but the next and not as easy a task is to name the remedy. I think however that if we can have an inspector who understands and will attend to his business, and if deemed necessary a license for milk-venders, and the consumers will pay as much attention to the source from which their supply comes as the exigencies of the case in so important a matter demand, many of the evils and dangers arising from the use of bad milk will be abated if not altogether avoided. In any event let the State and the city boards of health take this matter in hand and see if remedies cannot be found that will add to the health of the community at large, and save the lives of the children.

DISCUSSION.

Prof. Prescott said that milk as an article of food is greatly underrated. It is not generally known that two pounds of milk contain as much solid matter as a pound of lean meat. It was, he thought, most frequently adulterated, and to this subject more attention should be paid. Poisonous water was often used in the adulteration, and people had a right at least to clean water.

The paper was accepted by the convention with thanks.

The following paper was read by the Secretary.

TRAINING-SCHOOLS OF COOKERY.

BY MRS. WILLIAM JENNISON, OF DETROIT.

The fact that not only the comfort but also the physical well-being of all classes of society depends upon a wide-spread knowledge of domestic economy in its various branches, makes it a matter of surprise that in our own country, at least, schools where this knowledge may be acquired should be a novelty.

In all the industrial pursuits followed by men, and in some of those which are given up to women, a period of apprenticeship is a matter of course, and when this is over, wages are justly proportioned to the degree of skill attained.

It is the neglect of this necessary preparation in the department of domestic service that makes it a constant source of trial to both mistress and servant; and it must be that the feasibility of schools where cooking and all other branches of household work shall be thoroughly taught has only to be demonstrated to secure for them a rapid and assured popularity.

But the appeal which this project makes to the desire for comfort in our own homes—be they luxurious or simple—is only the lower aspect of the question, and there are two other points of view that will enlist the interest and sympathy of a large class.

First. There are those who realize the importance to man of the question as to the food he shall eat—not only for the preservation of life but also for the maintenance of health, and who believe that the scientific researches which can determine how this complicated machinery of the human body may best be kept in working order, can be made of practical utility to the masses, to whom such knowledge is unattainable. The effect upon character of certain kinds of food and the morbid craving for stimulants, which results from imperfect nutrition, are familiar facts. Yet a recent writer has truly said that "the relations, not only between food and a healthy population, but between food and virtue—between the process of digestion and the state of mind which results from it—have occupied a subordinate place in the practical arrangements of life; and it is certain that an adequate recognition of the value of proper food in maintaining a high standard of health, thus promoting cheerfulness and good temper and an improved moral tone, would require almost a revolution in the habits of a large part of the community."

The sanitary importance of the intelligent use of the food within the reach of the masses will doubtless be developed by speakers here present especially competent to treat this aspect of the question. That the working classes fail in making either a nutritive or an economical preparation of their food is well known, and this is largely due to ignorance. There would seem to be reasonable ground for the hope that this failure might be remedied, at least in part, through the facilities afforded by cooking-schools. A quiet, useful domestic life is an unceasing educator, and a home cannot be comfortable where the wife and mother knows nothing of cooking or practical economy, or the art of keeping a neat and orderly house. The disastrous results of ignorance as to such preparation of food as insures a wholesome nutritive diet was demonstrated during our late civil war. The frightful mortality from disease revealed the damage in the way of constitutional weakness, wrought by previous years or generations of unwise feeding. This result was aggravated too by the inability of our volunteers to make the most of their rations. It was said that while the soldiers were actually sickening for want of proper food the waste was such that the French army could have followed in their wake and lived well off the provisions left behind them.

Secondly. Those who have at heart the improvement of the thriftless, dreary homes that so abound in our land will readily appreciate how much further the poor man's wages would go if his wife and daughters knew how to buy and cook properly the most nutritious food within their reach. This consideration, together with the opportunity of thorough training for young girls for domestic service, which these schools would afford, must make it evident that no better work could be done by christian benevolence for the improvement of the physical condition of the working classes—nothing which will more truly help them to help themselves.

This view of the question is pressed with the hope that it will not be deemed irrelevant even in a convention in the interests of sanitary reform, inasmuch as in a city no larger than our own, any experiment in the direction of a self-sustaining cooking-school, ought to command the combined efforts of all, who from various reasons may be interested to further the project.

Perhaps the outline of a plan that would seem to be practicable for Detroit, may be useful, at least as a starting point for discussion. The following is therefore submitted:—

The object of the school shall be to give instruction in both the theory and practice of cookery.

The elementary branches of plain wholesome cooking shall be taught, as the groundwork of domestic comfort and economy.

Classes to be formed of those who desire to fit themselves for teachers or cooks.

Public classes for those who are seeking a practical knowledge for their own homes.

Private classes for the higher kinds of cookery to be provided for whenever the sale of a sufficient number of tickets to cover the expense attending them, can be assured.

Instructive lectures to be given on the articles of food in daily use, and inducements offered to all who desire it to learn how best to use them.

Cooked food to be sold to help defray expenses.

A class for girls over ten years of age, to be held every Saturday, when lessons shall be given in the making of bread, and of nourishing, economical soups. Cooking for the sick-room to form an important branch of instruction.

With this beginning, the work might be trusted to develop naturally to meet the wants of our own community. Probably a useful and profitable work might be done by preparing and offering for sale, at a cost to cover expenses, substantial well-cooked food. This would afford one class of persons the opportunity to learn, and another class to purchase, who by reason of daily labor, perhaps away from their own homes, have no time even for marketing, except before 7 A. M. or after 6 P. M., and who must return home at night too weary to take proper care in the preparation of food.

It is a favorable augury for the future of cooking-schools in our own country, that the Bureau of Education in Washington has considered the subject of sufficient interest and importance to devote to it one of its "Circulars of Information." It contains full statistics of the European and American Training Schools of Cookery. A limited number of copies of the pamphlet are in the hands of the secretary of the convention for distribution among those who may desire to see it.

The following details concerning the cooking-schools in successful operation at home and abroad, are gathered from it:—

The National Training School for Cooking at South Kensington was the result of a course of lectures upon food, delivered by Mr. Buckmaster in 1873–4, and is self-supporting. Its object is the training of teachers of cookery, and the diffusion of general intelligence upon the subject.

The demonstration-room is fitted up with a platform, across the length of which runs a table; tiers of chairs face the table; behind the teacher are dressers and ranges with closed and open grates. Most of the dishes are cooked over gas-jets attached to the table. A black-board shows the list of dishes to be cooked. The teacher specifies the exact quantity of each ingredient as it is added. When the lesson is ended the dishes are placed on sale.

Teachers are provided for other institutions at a stated fee. The course begins with instruction in the cleaning of utensils and the lighting and management of fires. The full course comprises five months, consisting of practice, examinations, and teaching. The fee is $100.00. The staff teachers are recruited from the pupils. Branches have been successfully established in most of the large cities of the north of England, and constitute now the "Northern Union of Schools for Cookery."

In London, classes in middle-class and artisan cookery have been successfully opened in localities tenanted by the persons they are intended to benefit. Recent reports state that instruction in practical cookery is now a part of the new system in all the public schools of that city. Lessons are given on food and its preparation in every Girls' School; and for advanced classes there are 21 practice-kitchens established in different parts of the city, fitted with suitable appliances, and presided over by skilful teachers. The innovation was advocated on the ground that while the school board spends much money for instruction in ornamental branches, a knowledge of the common practical arts of household life is losing ground among the people.

The "Edinburgh School of Cookery" was the result of a public meeting in 1875. Its success is established. The interest was such that lessons on request were given in over 40 of the surrounding towns to large classes.

"Cooking-Schools" and "Peoples' Kitchens" are in sucessful operation in France, Holland, Prussia, and Switzerland, and some of them enjoy distinguished patronage.

The "New York Cooking-School" is widely known as the starting point of the movement which is gradually changing American cookery from wasteful and unwholesome methods to the more artistic and economical processes that distinguish the semi-scientific cookery of Europe. This school was opened in

1874. In 1875 it passed into the hands of Miss Juliet Corson and under her able management has become the leading school of the country. The following method of instruction was adopted: The pupils assemble in the lecture-room to listen to a brief analysis of the various articles of food to be cooked during the lesson and the effect which they would have upon the system after they were eaten. Directions are then given for choosing and buying them, and for preserving them fresh and untainted. The class is then taken to the kitchen, where they watch the preparation of the bill of fare, and the serving of the dishes after they are cooked. There are classes for children, and also for adults, in plain and finer cookery.

The pupils are taught that plain and inxpensive food may be so cooked as to preserve its best qualities, produce maximum results from given quantities, and make dishes that appear and taste equally well with those served at the tables of the best hotels and clubs. In addition to cooking fresh materials well, pupils are taught to economize the remains of food by converting them into attractive and palatable dishes. Two public lectures at Cooper Institute were attended by 5,000 people. From January to April, 1879, the total attendance at public and private lessons and lectures was 6,560.

The Boston Cooking-School, under the direction of Miss Parloa, was opened in 1877. Her lessons are characterized by extreme neatness and economy. During her inspection of cooking-schools in England, in 1879, she wrote that "in most cases what is really needed is not that all kinds of rich and fancy cooking should be taught, but that there shall be schools in every city, town, and village, where, for a small fee, every one can go and learn to do the common every-day things well. These schools must be taught by educated ladies, in order that the work shall not fall back to the low plane from which it is rising; and they should not be charity schools, for they would thereby fail to reach their highest usefulness; but they could be nearly self-supporting and yet the fee be within the means of all. There should be, somewhere in the United States, a training-school for teachers, and in every town and village a room where girls from ten years old and upward could be sent from the public schools for part of a day every week to learn the first principles of cookery and cleanliness. Schools like these would bring down the percentage of criminals and paupers, for dirty homes and improper food help fill our prisons and almshouses. It seems as if State and municipal governments could not long be blind to these our interests and the interests of humanity in this matter."

The Agricultural colleges of Kansas and Iowa have a course of instruction in domestic economy and hygiene. In one of their reports it is said "We have found it just as feasible to give this practice, with profit and pleasure to the pupil, as it is to give laboratory practice in chemistry, and no more expensive." In Illinois, North Carolina, Indiana, and Washington, D. C., cooking-schools are in successful operation.

One of the foreign letters from "W. D. W." published in the Detroit Free Press, contained an interesting account of an experiment in the direction of domestic training in the city of Gothenborg, Sweden. In 1865 a school was opened in that city for the training of young girls in household duties. They are taken,—twenty-nine at a time,—from volunteers from the public schools, at the average age of sixteen. They are compelled to remain in the training-school, where they lodge and have their meals, for two years and a half. Instruction is given in house-keeping, baking, cookery, laundry and needle work, six months continuously in each. Then, for a concluding course of six months they go to a *crèche* connected with the school, where laboring women may leave their infants or very young children to be cared for while absent at their work. Here they are taught the care and training of children, providing for all their wants, and mending their clothes. Instruction is given also in the treatment of the simpler maladies of infancy and childhood. These pupils are all daughters of mechanics and laborers, and are in great demand as servants as soon as they are graduated.

The absence, with us, of those clearly defined and impassable dividing lines, which in other lands settle many questions as to station and occupation, makes the condition of our working classes an anomalous one. Until this social chaos shall have had time to work itself out into some settled result, the difficulties arising from it may perhaps be lessened by a persistent effort on the part of intelligent and cultured women to infuse into the class of girls that furnish recruits for domestic service, a wiser and truer estimate of its worth and real dignity. *Now*, it is regarded by our young women as placing them at the very foot of that social ladder, whose top-most round seems to them attainable at some future day, and it is quite natural that to an ignorant girl, duties which she undertakes at will, and for which no previous training is required, should seem only worth the doing until something better shall be within her reach. It is evident that training-schools of cookery would do much to elevate the occupation in the eyes of those who follow it; and a little genuine knowledge as to the chemistry of food, on the part of the wives and mothers in the upper classes, could not fail of happy results to themselves, as well as, by way of example, to those in humbler station, who are so ready to imitate their dress and their manner of life.

Perhaps we under-estimate the *moral* importance to the young, of some guidance in a useful direction, even in purely material things. Early training in domestic duties is the only sure method of acquiring a mastery of them, and certain independence awaits the woman who is thoroughly versed in the routine of household life. But there is a higher aspect of the question. The manifold snares that beset young girls in the lower and middle classes, may perhaps be shorn of some of their power for evil if we can excite an early interest and ambition to learn thoroughly the duties to which they are looking forward as a means of livelihood. And may not the developing, feeding, and fortifying of this worthy aspiration, which comes readily to almost every young heart, be a real obedience to the Divine precept to "overcome evil with good?"

Detroit, January 7, 1880.

A paper on the adulteration of food, written by Dr. Carl Jungk, Professor of Chemistry in the Michigan College of Medicine, was presented, but the reading was omitted on account of the lateness of the hour. The paper is as follows:

ADULTERATION OF FOOD.

BY PROF. CARL JUNGK, OF DETROIT.

The adulteration of articles of food and medicine, keeping pace with the advancing strides of science, has in recent years assumed such proportions, that the governments of different countries in the civilized world have, in the interest of humanity, been obliged to keep a wakeful eye on this branch of industry. England was the first which assumed the defensive, in spite of much interested opposition, and during the years 1862, 1872, 1874, passed laws with reference to this subject. This took place in spite of the protestations of defenders of this industry, that it was not possible for science, as yet too fallible, to discover adulteration with certainty, and that any money appropriated for this purpose would be wasted, not invested. Although these arguments, even at the present time, may deserve consideration in isolated cases, it is nevertheless a fact that the methods, instruments, and aids of science are so manifold, that given an expert professional whose energies have been trained in this direction, the discovery and application of unfailing detective methods arise with the exigency.

The good arising to science itself from the pursuit of this work is immeasurable, particularly to the branch of chemistry which had thus far displayed but little activity in this field of research.

The first step contemplated in England by the laws above mentioned, was the appointment of public analysts with the special task assigned them of examining foods and drugs for their purity, and reporting adulterations if such were found.

These public analysts have formed themselves into a society for the furtherance of their interests and promotion of mutual activity, and the first task assumed by that body was of course to settle definitely what constitutes an adulteration.

A special commission was entrusted with the elaboration of this problem, whose conclusions were communicated at a session of the society, and after proper discussion and criticism adopted with but trivial alteration.

In this way the following definitions came to be adopted:

An article is to be regarded as adulterated.

a. The subject being an article of food or drink.

1. When it contains ingredients deleterious to the health of the consumer.

2. When it contains a substance which increases its weight, volume, or apparent strength, or lends it a fictitious value, exception being made where it is necessarily conditioned by the production or collection of the ware or needed for its preservation, or where its presence is specified when sold to the consumer.

3. When the article contains little or none of the main ingredient alleged to be present.

4. When the article is an imitation or vended under the name of other wares.

b. In case the subject is a drug or medicine.

1. When it is sold for medicinal use under a name official in the British Pharmacopœia, and deficient in strength and purity as compared with the standard adopted in this work.

2. When it is sold under a name not covered by the British Pharmacopœia, and possesses a materially different composition from the one attributed by recognized works of authority on Pharmacology.

In reference to certain articles of food, definite standards of value have been assigned, below which these wares must not fall.

Milk must not contain less than 9 per cent by weight of solid constituents besides the fat, and not less than 2½ per cent of butter.

Skimmed milk must not contain less than 9 per cent by weight of solid constituents besides the fat present.

Butter must not contain less than 80 per cent of pure fat.

Tea must not contain more than 8 per cent of mineral ingredients from the sample dried at 100° C., and of these, 3 parts must be soluble in water.

Tea, in the condition in which it is sold, should yield at least 30 per cent of dry extractive matter.

Cocoa must contain at least 20 per cent cocoa butter.

Vinegar must not contain less than 3 per cent anhydrous acetic acid.

This proceeding of the British government against the adulteration of wares soon found ready following in Germany and France, and has everywhere been attended with beneficent results.

The analysts of England particularly can well be proud of the achievements in this field of analytical research. It was but a few years ago that the detection of foreign fats in butter was a problem surrounded by many uncertainties, but the labors of one of these public analysts, Otto Hehner, appointed for the Isle of Wight, resulted in discovering a sure method for the detection of these foreign bodies, as well as a quantitative estimation of the fats used as adulterants. The prize offered by the German government for the solution of this question was also awarded to this analyst.

A series of careful analyses of the fats composing butter show that an unfailing method for the detection of foreign fats must be based on a quantitative determination of the non-volatile fatty acids present, which vary in amount within very narrow limits. The season of production being without perceptible influence in increasing their variation, the limits of variability in the case of pure butter being 86½ per cent to 88 per cent; 87½ per cent being accepted as an average for the purpose of analysis, while in the case of other fats 95½ per cent represents the proportion of non-volatile acid present.

As an instance, should we find in butter a percentage of non-volatile acids equal to 91 per cent, this would represent an admixture of 43 per cent of foreign fats—arrived at by the equation: $95.5 - 87.5 = 8$, and $91 - 87.5 = 3.5$; then $8 : 3.5 :: 100 : x$; $x = 43.75$.

A further adulteration of butter consists in the addition of various vegetable coloring substances, usually anatto or curcuma, or even the coloring matter of tomatoes.

Although these additions cannot be regarded as dangerous in themselves, they nevertheless can serve the purpose of concealing to the eye an admixture of foreign fats or the defects of poor butter itself. This instance will be sufficient to demonstrate that to the practiced scientist the most difficult problems in this field must finally yield a solution.

When intellects such as Dr. Hassall, Dr. Stephenson, Dr. Turni, Dr. Mal, Dr. Dupi, and Dr. Wittstein occupy themselves with the examination of foods, we do not make too great a claim in saying that the analytical determination of foods will soon be robbed of its difficulties, and be on as secure a footing as the analysis of minerals. The labors of these learned men establish beyond question the occurrence of adulterations such as are possible only to those thoroughly conversant with the physical and chemical properties of the objects in question, and needing for their detection a thoroughly practiced analyst.

Another prominent article of consumption is milk, whose purity is of special importance in its application to the feeding of children. Occasionally milk has been found to contain arsenic, mercury, and lead, after these agents have been administered to the cow either as internal or external remedies. Hartwig and C. Mulder found arsenic in the milk of cows after quasi medical treatment with this poison. Vervier and Heppen found quicksilver in the milk after the cows were anointed with a mercurial ointment. Vander Boom Mesh found lead in milk of cows which had been grazing in pastures supplied with manure from white-lead factories.

Although such occurrences are infrequent, inasmuch as the yield of milk usually ceases with the appearance of disease, still they deserve consideration as possibilities.

The "milk-sickness" or "milk-disease" which has been observed in South America and the country west of the Mississippi is also worthy of mention, as not only does the milk itself constitute a dangerous article of nourishment, but also the butter and cheese prepared from it partake of its poisonous properties, which are not destroyed even by an exposure to a boiling heat.

The adulteration of milk with water is of such common occurrence that in the larger cities of this country the health boards devote special attention to the examination of this fluid, with the design of detecting and punishing offenders who engage in this business. The examination of milk is usually performed by a determination of its specific gravity—1.028 to 1.032,—or else by means of instruments which involve the principle of color comparison. Cream can be assayed by means of the same instruments. The addition of salt heightens both the specific gravity and the flavor; while starch is another frequent addition. The percentage of ash is an important factor to the analyst, its normal ratio being from 6 to 10 parts in a thousand.

If we assume that the consumption of fresh milk averages 120 quarts per capita per annum, this would amount to 12,000,000 quarts for a city of 100,000 inhabitants. The value of this quantity at 6 cents per quart would amount to $720,000. Were this milk adulterated with only 10 per cent of water, it will represent a sum of $72,000 dollars paid for this needless adulteration. Bearing in view that milk has often been found adulterated with equal parts of water, it might appear that large sums have been paid unwittingly in this manner.

Beer.—The nature of this article does not permit of so extensive an adulteration as is the case with milk, as it is usually kept longer and has to endure greater exigencies of transportation.

The important ingredients of beer are water, alcohol, gum, gluten, and hop-extractive. The proportion of alcohol varies from 3 to 10 per cent. The brown extractive is frequently replaced by burnt sugar. The hop bitter is replaced by cocculus indicus, quassia, and even strychnia. The presence of strychnia was determined in English beer at the instigation of a physician who suspected its presence. Cayenne pepper and grains of paradise are added for pungency, lavander and caraway used for flavor, licorice, molasses, and honey for sweetness and consistence, and green vitriol, alum, and common salt for effervescencing and frothing qualities.

The New York Times states in an article that adulteration of beer has increased greatly within a few years, and certain Englishmen claiming to speak with authority, say that but one gallon of beer in twenty now made in Britain is free from adulteration.

The quantity of beer manufactured in Britain and Ireland in 1874 was estimated at 29,364,343½ barrels, or 1,051,116,366 gallons, of which by far the greater part, 52,578,830 bushels of malt, representing 942,238,840 gallons, were produced, drugs and all, in England. A good, thoroughly fermented and finished beer, used moderately, is, as Liebig says, "fluid bread," and in many sections this drink forms a part of the usual nourishment. Where much beer is consumed good and pure lager beer is difficult to obtain. In the first place its production necessitates enormous storage-vaults, and, secondly, the capital invested cannot be turned over frequently. In addition, the beer-consuming public, judging its quality superficially, by the amount of froth which accompanies it, the brewers and sellers are not slow to take advantage of this circumstance. They learned to mix old and new beers and thereby obtained a strong foaming beer, which satisfied both parties, though the stomach frequently murmured its objection.

In order to distinguish new beer from lager beer F. J. Cral makes use of the following method: A solution of persulphate of iron of 20° Beaumé is mixed with 16 parts of beer. With lager beer or beer in which the fermentation is entirely complete a turbidity ensues with completion of deposit after standing for fifteen minutes, while the supernatant liquid occupies five-sixths of the space. A beer which has not been thoroughly fermented gives a more voluminous precipitate, always in proportion to the newness of the beer and incompleteness of its fermentation, very new beer even getting thick from the precipitate formed.

Vinegar has been adulterated with a variety of substances, principally to increase its sharpness. Among these may be mentioned mezereon and pepper. Creosote being sometimes used to prevent moulding, and sometimes accidental traces of lead and arsenic are met with, but the principal adulterant remains sulphuric acid, this being, however, very easy of detection. A very simple, rough test to demonstrate the presence of this acid is to drop a small portion of the suspected vinegar on a piece of thin filtering paper and warm it on a plate to evaporate the moisture. If sulphuric acid be present it blackens the paper in the spot where the vinegar dried, the oil of vitriol having charred the fiber as it became concentrated.

Wine adulteration has become so much of a science that it is possible to make wines entirely fictitious. A formula for making artificial Rhein wine reads as follows: 3 pounds barley malt, 100 gallons water, 12½ pounds potatoes, 4 pounds sugar, 100 grains yeast, ½ pound tartaric acid, 3 quarts of alcohol 95 per cent, and a portion of elder flower as flavoring material. If this mixture is subjected to fermentation, a wine is obtained resembling Rhein wine, having, however, one fault, that it will not keep well, although its keeping qualities are much improved by the addition of genuine wine.

The adulteration of tea has assumed enormous proportions, the large consumption having offered a tempting opportunity to unscrupulous speculators. Even in China the practice has obtained of concentrating the fine aroma of tea in essences and reflavoring exhausted leaves therewith. Poor qualities of tea likewise have their aroma improved by the addition of foreign plants.

The public analyst of London, Dr. Saunders, recently examined samples obtained from the large dealers of the city. He discovered five samples which were adulterated and deleterious to health. One of these samples was composed almost entirely of exhausted leaves; the second of a mixture which contained 70 per cent of tea dust; a third of tea dust, sand, and a foreign vegetable coloring matter; the fourth, to give it a deceptive weight, contained stones the size of a pea; the fifth was from the hold of a ship that had foundered on the coast of Portugal, whose owners, after recovering the chests, dried and sold the tea.

One instance should be adduced where the consumer is most to blame for the adulteration. This is in the line of spices. Where the buyer insists on obtaining the article in a powdered state for less than the unbroken spice can be obtained for. In such case he must be satisfied with his bargain if he obtain powdered cigar boxes in place of cinnamon. Other spices are also adulterated with ground crackers and refuse of various kinds.

To entirely cover the ground of adulterations, practiced on articles of food, would compel too lengthy a dissertation, but two instances of food entirely unfit for consumption deserve special mention. These refer to diseased or improperly prepared and consequently deleterious food. One is the much talked-of "potato-blight." The various questions raised in the consideration of this disease have not yet all been satisfactorily answered. As the potato is never consumed in a raw state the poisonous ingredient of this blight is in all probability destroyed in cooking. When we consider, however, that the tubers are in a condition of dry rot and the seat of a developing fungus, we are forced to the conclusion that such nourishment cannot be very conducive to a condition of perfect health.

The poison found in diseased sausages, "*Venenum Cotulinum,*" is the second instance. It was first observed in the year 1793, and the statistics show the dangerous results of the consumption of such diseased food. In Wurtemberg alone 400 cases are recorded between the years 1793 and 1853, of which 150 had a fatal termination. As to the true nature of the poisonous principle in these diseased sausages, we are still in the dark. Owing to the fact that cats and dogs enjoy complete immunity from the effects of this poison, physiological experiments with these animals are useless, neither has it been possible, so far, to produce, intentionally, such diseased condition in the sausages.

Many hypotheses in explanation of this disease have been offered, but none established. All agree, however, on one point in referring the origin of these diseased conditions to decomposition begun and operative during the period of preparation. Among the many reasons assigned as possibly connected with the origin of this affection are the heaping together of too large masses of filling, the addition of milk and bread crumbs, too large a percentage of contained moisture, careless packing by which air-spaces are left, incomplete or often interrupted smoking.

I will lastly take into consideration a very common but indispensable article of nutriment, namely, water. Although usually not designated as food it nevertheless occupies such an important position as an essential constituent of the human body, and is so absolutely indispensable to the preparation of food that its purity is of the first importance for these uses as well as for purposes of drink. Water is largely dependent for its purity on the character of the air with which it comes in contact. The air which arose from the Pontine Marshes was called, by the ancients, malaria, that is bad air, so named from the miasmatical infection with which it was loaded, and known to be productive of fever and other diseases. We know that stagnant water contains in abundance such miasmatic poison, and even, possibly, according to Pettenkofer's researches with surface waters, cholera poison, which can be given off and infect the human organism.

The conditions favorable to this impregnation of the water with disease-germs are a temperature conducive to fermentation, the presence of decomposing organic nitrogenous substances, and contact of air.

The drainage from marshes and surface water can frequently have access to and contaminate the water furnished to the consumer, where the means of supply are defective or in poor repair. When we consider that usually the alarm is only sounded when the substances contained in the water have become so far advanced in their decomposition as actually to offend the senses, or when the consumption has had as a result frequently occurring cases of sickness, traceable only to this cause, it will be seen what ravages may be possible by the disease-germs borne to the unsuspecting consumer in this liquid and regarded by his simple faith as innocuous. It is, however, not indispensable that there should be direct contact with such impure water to convey the impurities, as it has been shown by the interesting researches of Frankland, that organisms and putrefying matters can be carried by the air and other agents as well. One experiment of Frankland's deserves special mention here. In a glass full of water he dissolved a small quantity of chloride of lithium, a substance which can be detected by means of the colored flame it produces in the spectroscope in such small quantity that one part of lithium in 100,000 of water are still easily recognized by means of this instrument. On blowing air across the solution contained in the glass and making the air then traverse the flame of the spectroscope no traces of the lithium could be detected. On adding a few fragments of marble and a little muriatic acid, having for its object the production of a slight effervescence, he was at once able to detect in the air traces of lithium carried there in the shape of spray from the effervescing solution and still present in undiminished quantity at a distance of 20 feet from the source when the current of air was drawn gently in that direction. The decomposition of organic matters, especially such as are present in marshes and stagnant waters, is always accompanied with the evolution of gas, the bubbles of which, as they escape into the air and break, effect the same mechanical division of the liquid as the effervescing mixture of Frankland, and enable some of it to be carried or floated away bodily, although in a very attenuated state. It may then easily reach and infect water used for drinking-purposes if at not too great a distance. These considerations are weighty enough to make it an imperative necessity to remove from human habitations, in pipes or conducts, closed to the air, all fluids undergoing putrefaction; likewise to drain marshy districts or else plant them with sunflowers, eucalyptus, or other vegetables known to absorb the moisture from the soil and neutralize malarial poison, for it is an undeniable fact that fresh, vigorous vegetation is directly antagonistic to such disease-breeding organisms.

A description of the methods used for detection of miasmatic poison and bacteria in the atmosphere by means of artificial dew formation and the propagation of these organisms, also artificially by means known to the scientist, would be interesting, without doubt, but would digress too much from our subject.

What has been said thus far will be sufficient to indicate the necessity of greater attention, of more zealous watchfulness being exercised at home in our own country to guard against the efforts of the unprincipled to adulterate our food and drink. Surely, in a republic whose watchword is humanity and its rights, we may expect so vital a matter as the right to live a pure and healthy life, to receive also a fostering protection and encouragement.

CARL JUNGK, Ph. D. (*Heidelberg*),
Prof. Chemistry, Mich. Coll. Med., Detroit.

School Hygiene was the title of a paper read by Prof. J. M. B. Sill, Superintendent of the public schools of Detroit.

SCHOOL HYGIENE.

BY J. M. B. SILL, SUPT. DETROIT PUBLIC SCHOOLS.

I shall occupy but little of the time of this convention in the discussion of the subject assigned to me, and I intend that whatever I shall say, shall be suggestive rather than dogmatic.

The subject seems to present itself in two aspects. First and perhaps foremost in importance, at the present time, are the indirect effects of school-work and school-discipline upon the general physical well-being of children. In considering this aspect of the subject we may leave out of view the material environments of the schools; omitting all discussion for instance, of ventilation, drainage, amount and management of light, and of all evils that are capable of correction by improvements in the form and location of buildings. and other mechanical means. This first department of the subject has to do not with school-houses, but with schools as such. The points of interest which it presents are due to the profound sympathies and the intimate relations that exist between spirit and flesh, between the soul and the material body vivified by the soul. So far as it deals with disadvantages and harmful influences, they are such as would exist if the ordinary sanitary conditions of the schools were perfect, and therefore beyond criticism or reproach. Under this head it is proper to inquire into the effects of certain phases of school-management and discipline upon the health of pupils.

The second department deals with the direct sanitary conditions of the schools, especially including the topics specified above as excluded from the first department.

First, then, as to school discipline and management. I ask this question: Is there not danger to the health of pupils in the vigor of the effort sometimes made by school authorities to secure high per cents of attendance? Taking into account the variety of diseases to which children are liable, the violent changes which are characteristic of the climate in this latitude, the large number of stormy and inclement days that fall to us during a portion of the year, and adding to these the various other causes of irregularity in attendance which must and do exist in every community, I am of the opinion that the exactions of the schools in this respect are sometimes excessive, and hurtful to the health of pupils. I do not underestimate the value of prompt and regular attendance on the part of the pupils. I am well aware from long observation and experience, that the loss through non-attendance can by no means be estimated upon the basis of the hours and days of absence, and that the evils of irregularity are far reaching, and when it is excessive, destructive of progress and ruinous to scholarship. But it is quite possible to have too much of a good thing, to lay such stress and emphasis upon constant attendance, to so visit delinquencies in this respect with direct or indirect punishment, and to so excite emulation and rivalry between pupils and between different schools, that children will be at school when they ought by all means to be at home. A few of the better and more ambitious pupils need restraint rather than urging in this respect, and girls especially, who are, on the whole, more generally faithful than boys to school duties, spurred on by pride in a perfect attendance-record, and by hope of approbation or fear of reproof by their teachers, will often overbear the counsels of a prudent mother who knows better than they can know, that there are times when over-exertion and exposure are dangerous, and may imperil health, happiness, and usefulness for a lifetime.

In view of these facts, it seems well that school-officers and employers of teachers should, for a time at least, cease to make too much of the per cent of attendance. Teachers should be allowed to feel that there is something else worth working for, and that their temporal salvation does not too largely depend upon it. The prime importance of holding pupils to steady and consecutive work, so far as this can be done without hardship and injury, is so evident to every one engaged in school work, and the consequences of unnecessary absenteeism are so disastrous to the prosperity of any school, that, left to themselves, and to the motives that spring from the necessities of the case, teachers are little liable to be too lax in this direction.

It is important to the health of children attending our schools that they be happy and contented in their work. Whatever depresses and unnecessarily restrains the natural bouyancy of spirit is injurious, and in the end dangerous. The body cannot long remain healthful if it be the dwelling-place of a perturbed, irritated, and unrestful spirit. A child constantly repressed and annoyed, thwarted in all impulses of childhood, in chronic rebellion against an unnatural and unwise discipline, not founded on sense or justice, but prevailing to some extent even at the present day in the schools, not only grows petulant and irascible, but, through the deep sympathy that exists between mind and body, suffers physically as well. I dwell for a moment upon this topic because so much affecting the health of children depends upon the tact and judgment displayed in school-management. The exercise of these qualities by a teacher makes school a happy place where peace and a useful contentment may reign. The exercise of their opposites, subjects the young to a wearing and burning irritation, as injurious to good health and vigorous growth as it is destructive to amiability and docility of disposition.

It is easy to point out the remedy for the evils thus indicated, but it is perhaps impossible in our day and generation to apply it with sufficient intelligence and vigor to bring about anything like a perfect cure. The remedy is the employment as teachers of only such persons as are fitted, not alone by culture and training, but by the gifts of nature for their work.

I confidently avow my belief that the true school-manager is born, not made by circumstances or by training. The normal schools are securing excellent and beneficent results. They are able to teach how the inexperienced may avoid the many disastrous blunders that pertain to apprenticeship; how to present the various topics of study right end foremost; how to arrange logically the order of work so that every step may be solid footing for advancement,—vantage ground from which to assault the difficulty next succeeding. They can do all these things and much more. They can intensify the enthusiasm of those who have in them the germs of a successful future, but they cannot transmute base metals into gold. They cannot supply to men and women who lack them, the tact, the devotion, the keen insight into human nature, the greatness of heart and the love of their kind that combine to make the genuine teacher.

I have said that the remedy is difficult of application, but a long step in the right direction will be taken when school committees and the public generally shall squarely recognize the fact that something more than knowledge is required to make an efficient teacher, and when, acting in consonance with this recognition, the best means shall be taken in the examinations of candidates for positions in the schools, to test not only for thorough and competent scholarship, but also for those higher qualities of mind and heart, that tact, good sense, sympathy, and inborn leadership, compared with which mere academic attainments are common and almost valueless. The results of such efforts must, however, in the nature of the case, be fallible, but if they are supplemented by sending adrift as failures those who in actual practice and after fair trial are found to maintain authority by mere force and energy of muscle, whose little empires are in perennial rebellion and whose subjects are full of wasting and unending heart-burnings, the desired end will nearly if not actually be reached.

There is also another danger, that of over-work and over-anxiety to the small minority of pupils who are exceptionally ambitious and conscientious in the performance of their duty, and the peril to such is greatly increased when to these characteristics is added extraordinary sensitiveness to the approbation or displeasure of the teacher. Such pupils need to be tenderly watched and carefully guarded. A great responsibility rests upon the teachers in whose charge they are placed as well as upon the parents whom God has made their natural guardians and protectors. They need kind and constant restraint as to the amount of work which they incline to do. Even approaches to failure in the school work should be overlooked and the keen mortification which is sure to follow should be modified and made easy to bear.

Such pupils are usually fragile in physique, and harsh or unskillful handling may easily break them down or unsettle the fine balances of the nervous system and make impossible of fulfillment the glorious promises of childhood.

I have thus indicated some of the dangers of school-life and pointed out what seem to me the natural defenses against them. Doubtless it will require much time to right these and other wrongs. But I believe that the schools are progressing in the right direction, and that as the years roll by, we shall hear of and see less and less of nervous irritability and prostration, and their train of attendant and consequent evils among the children who pursue their studies in the public schools. In all these respects the future of the schools is in the hands of the teachers, and I am hopeful of the future because my long intercourse with them has impressed me deeply with the feeling that they are in the main faithful, conscientious, and intelligent,—perhaps unduly conservative; perhaps too much inclined to move in the ruts of tradition, and too fearful of innovation, but on the whole honest and courageous.

This ends what I have to say in the first division of my subject, and I dismiss it with the statement of my conviction that it is the more important of the two.

As to school-architecture and the location of school-buildings there is substantial agreement among all who have devoted time and thought to the subject. No one disputes the desirability of spacious grounds, of open space permitting the access of air, and the necessity of perfect ventilation, thorough drainage, and an abundant supply of light,—but upon details, and the proper methods of securing all these advantages, much remains to be learned, settled, and formulated.

Let me call your attention for a moment or two to some of the many and frequently conflicting conditions that often require to be met and harmonized. For instance: the value of ample play-grounds, the necessity for pure air and abundant light point to sparsely settled regions, where land may be had at reasonable prices, where atmosphere is untainted, and the light undimmed by smoke and unimpeded by the walls of lofty buildings, as proper locations for schools; but on the contrary unbending necessity often demands that they be established in the most densely populated portions of our great cities, where it is impossible to secure even tolerable hygienic conditions.

Many intelligent citizens and enlightened physicians justly complain of the injury brought about by the excessive amount of stair-climbing made necessary by the height of school-buildings. Of course where sufficient ground is obtainable there is no adequate excuse for third and fourth stories. But sufficient ground is not always obtainable, and then the choice is between lofty buildings or buildings inadequate to the wants of the district in which they are located. In such cases let the attempt be made to mitigate the injury of stair-climbing by reducing the height of the stories, and you are met by difficulties in ventilation, and in the admission of the necessary amount of light.

Again architectural effect must not be wholly ignored. Public buildings ought to be models of good taste and proper proportion, and people will decline to be taxed for the erection of architectural monstrosities even if they serve practically the purposes for which they were intended.

If land were always obtainable in large areas and in convenient shape, and if an inexhaustible supply of money were always procurable, many of the difficulties that beset the school-architect would speedily disappear. But in cities like Detroit those who build school-houses are confronted by certain obstinate conditions, mostly financial, that insist upon being met and respected. Yesterday a suggestion was made that every school-room should be oblong and lighted by means of windows in the longer sides. Lighting by means of windows on both sides of such rooms means, of course, outside walls on both sides, else the windows on one side would be useless. This would be quite practical in the case or buildings containing two or even four rooms. But please conceive of the amount of territory that a twelve-room building, erected on this attenuated plan would straggle over, of its enormously increased cost, and of the amazing architectural effect of such a structure.

While, as I have said before, there is substantial agreement as to the main points in school architecture, and the proper location of buildings, there remains an indifference and a carelessness in these matters which can only be corrected by constantly urging their importance upon the people. One of the best uses of conventions of this kind is to serve this most useful purpose, and I am thankful to all who aid in the bringing about such a state of public opinions as will make gloomy and unhealthful schools an impossibility, and forbid, except in cases of absolute necessity, the erection of school-houses more than two stories in height.

The subject of ventilation, and the best means of securing it, have, I believe, already been discussed in other papers, during the sessions of this convention. I shall close this paper with a few suggestions additional to those made on the paper read yesterday by Professor Lundy on the management of light and the amount necessary to thorough and safe illumination.

Practically I have found that light should be admitted from two sides of a school-room. In clear days, when the direct rays of the sun fall upon the windows of one side, it becomes necessary to protect pupils and teachers by means of proper shades capable of excluding some of the light. This leaves the windows of the other open side free for the ingress of all the light they are capable of admitting. In nearly all the rooms in the more modern school-buildings in this city light is admitted from the rear of the room, and from the right or the left hand side of the pupils as they sit at study. Unquestionably pupils should not sit facing the light, but if this condition be carefully observed and the quality of light be abundant, I do not regard the direction from which it comes—whether from the right hand or the left—of vital importance. The chief objection to the admission of light from the rear of a room is that the teacher is usually so seated as to face it. She has however much greater latitude in movement than can be conveniently granted to pupils, and is usually able in this way to ward off any bad effect. In some schools the seats are so arranged that the teacher sits behind the pupils and with them faces the unlighted side of the room.

At all events, if light is to be introduced from two directions, which seems to be essential, either pupils in large buildings must face the light (which is not to be thought of) or light must be admitted from the rear, for it will be found impracticable to construct a building of considerable capacity in such a way that window-space can be had on opposite sides.

As to the coloring used upon walls, I have found tints nearly neutral but containing a predominant suggestion of yellow most agreeable and restful to the eye. In the coloring of wainscoting and inside woodwork generally, the yellowish tinge commonly used as a ground for oak-graining seems to be well adapted to the reflection of a large amount of light without wearying or irritating the eye. Ceilings, I believe, should be white.

Window-shades should be of neutral tints, sufficiently heavy to soften the glare of intense light while they at the same time admit the larger portion of it.

Since the main object of shades is to soften the light and to shut out the painful glare and heat of direct rays, and since, during the warmest and lightest portion of the year, the sun is high in the heavens during school-hours, we have found it best to hang them in such a way they may be lowered from the top of the window and when in use cover its upper portion.

As to the necessary amount of light and the proportion of window-space to floor, all the discussions I have heard on the point leave me in doubt. It appears that there is such a thing as having too much light. In a neighboring city in this State a school-room 37x51 feet in size and lighted by eight windows, five of them on the left and three in the rear of the room, was found to be excessively lighted, and it became necessary, for the comfort and safety of the pupils, to change the light-colored shades for others darker and more opaque. Here was a case where the pupils did not face the light and where the longer row of windows were on the left side, and yet with a proportion of window-space amounting to only twenty-two per cent of the floor, it was necessary to darken the rooms considerably. In a room where the percentage of window-space to floor is not more than 14 or 15 I can, in a dull and cloudy day, read the finest print in the corner of the room most unfavorably situated for the purpose, without effort and without bringing the page nearer to the eye than the normal distance. Is not this a fair test, and, if so, is more light needed or even desirable?

In the admirable paper read yesterday, to which I have already referred, the opinions of authorities on this point were given, but nothing was said of the specific tests or the careful experiments upon which these opinions have been based. I have abundant respect for the judgment of experts, but mere dictum is hardly satisfactory in such a case. Danger lurks in either extreme, and I still question whether even the minimum proportion suggested, viz., thirty per cent, is not, under ordinarily favorable conditions, excessive and at least liable to be injurious.

In reference to myopia and kindred ills, I suspect that under the most favorable conditions of school-life and of home-life these diseases will not entirely disappear, but persist to plague humanity in the future as they have in the past. We must pay something for our constantly increasing enlightenment, and since the eye is the main medium through which knowledge is acquired, those nations that make great attainments must perhaps win their honors at some expense to the wonderful and delicate organ chiefly concerned in the accomplishment of their triumphs.

Dr. C. C. Yemans, of Detroit, secretary of the convention, read the following paper on cosmetics:

COSMETICS.

BY C. C. YEMANS, M. D., OF DETROIT.

With the æsthetics of my subject I have nothing to do. Cosmetics may include many surgical operations performed only to remedy defects. There are certain drugs also taken for cosmetic effects only, as arsenic for causing pallor, belladonna for dilating the pupil, which is supposed to give one an intellectual appearance. These are dangerous in many ways, but do not come within the scope of my theme. Cosmetics are those simples or compounds used (applied) either upon the skin or upon the hair, commonly classed as washes or dyes. While I cannot write of æsthetics here I wish to guard myself by endorsing all proper methods for causing one to be attractive and even admired. Cosmetics, under my definition, will also include washes and powders for cleansing the teeth, but I cannot give an opinion concerning these. You may doubt the pertinency of presenting my thesis here, but there is much unhealthfulness in the promiscuous use of cosmetics.

There are serious results, with which every experienced physician is familiar, arising from the use of hurtful cosmetics. In our State of Michigan the right of private judgment is carried to such an extreme that one can scarcely write of any hurtful thing unless he antagonizes some private enterprise. Voltaire said of needed reform in management of hospitals in Paris: One soon finds, when a reform of great abuses is undertaken, the abuse is bread and butter for some person. As to food, our laws are so framed as to protect the weak by arresting the wrong-doer. Unwholesome meat is condemned; adulteration of food is prohibited; to sell or dispense certain drugs is prohibited by proper laws; yet in some directions, no matter how harmful an article or how ignorant a person, he must not be hindered. Any person in Michigan is well qualified to practice medicine. Michigan is a paradise for charlatans. The unsuspecting crowd is robbed or poisoned or harmed by charlatan or pretender with no one to hinder or make him afraid. Wise men regret but do not oppose the procedure. In medicine, men and women who know nothing of grammar, arithmetic, or anatomy stand on the same level with the careful, the learned, and the responsible person, if indeed such have not the advantage to a high degree. Now the people need some protection, that is to say, one who deals with remedies so potent should know something. Men seem ever ready to serve the wrong, as when some effort is made to protect, by proper legislation, the life and health of the members of the commonwealth, the cry is at once raised, "You doctors want protection; a monopoly." I leave the inference as to who really needs protection.

The application of this to my thesis is apparent. Lotions, powders, dyes—of the composition of which we are quite ignorant—are sold which are dangerous in the extreme, producing sickness, insanity, paralysis, death, with no protest, no protection.

Cosmetics have ever been used to please the fancy, and will be, I suppose, without regard to their harmfulness. The woman of the forest, and man as well, have more striking colors but less harmful compounds than adorn the visage in modern parlors. You see how I am compelled to deal almost entirely in generals in order not to *advertise* a bad article by giving it attention and prominence.

Let us consider the skin and one of its appendages, hair.

The skin is a curiously complex envelope having important parts (Anatomy), and functions (Physiology). Our bodies are defenceless and dead when a certain percentum of its area is destroyed. A body composed of fluids and solids which react (decompose) when in contact with air, is capable of moving from point to point by the integrity of the skin. The skin itself, is protected and kept from destruction by the atmosphere, and rain, and heat, and cold, by certain functions, and by certain matters secreted by organs within the skin. The follicles for sebum which secrete a lubricator, an oleagenous coating which resists the action of external moisture, the follicles for sweat which tend so much to maintain uniformity of temperature, $98\frac{1}{2}$° F.; also the skin is a natural outlet for certain excreta, insensible perspiration. On the other hand the skin has the function of absorbing—secreting—so that one may be sustained by inunction. Young infants are so fed and life saved. This fact is utilized by the physician in giving remedies through the skin. Often more protent and quite as effectual results are obtained than when the same remedies are taken into the stomach. Now medication is not the objection in the use of cosmetics, yet at the same time if these contain drugs readily absorbed and harmful one may have all the injurious results, while not desiring them. I will not write of those diseases which attack the skin itself, for want of time, but shall only consider some of those which affect the general health by secretion of deleterious matter. Hair-dyes are especially harmful in causing paralysis or insanity. Or they slowly produce changes (molecular) which become permanent and incurable, leaving a life-long burden on some innocent person or persons quite as bad as do poisons by inoculation, for example syphilis.

As to washes and powders for the face, as lily white or magnolia balm, for example, they are hurtful in many ways, and when they contain mercury, subnitrate of bismuth, lead, arsenic, the poisonous effects (toxicology) of which are well known. In overdoses they cause death, in small and frequently repeated doses paralysis, partial death. Examples of insanity and paralysis are not infrequent, especially the latter. I have met patients having all the symptoms of lead-poisoning, and as this most often occurs to women, we find a sad and helpless family depending on a paralytic mother ("for pride attends us still.")

Not long since a woman consulted me who had no control of her hands; she could not sew, or mend, or eat, unless assisted,—all from a face-wash which is daily sold in quantities in this city. I could cite many cases, but will not take time here.

1. Some protection, by some wholesome enactment, should be afforded those who know not what they do.
2. Not only the skin is injured but permanent harm may come to one from the use of those cosmetics which have for their basis the minerals I have named.
3. There are helpful cosmetics made, or at least good cosmetics can be secured, which increase the beauty and do not harm the skin.

REPORTS OF COMMITTEES.

COMMITTEE ON WATER-CLOSETS AND BATH-APPLIANCES.

To the Chairman of the Sanitary Convention:

Sir,—Your committee appointed to examine water-closet and bath-appliances, respectfully submit the following report: The four water-closets exhibited undoubtedly represent the four best appliances for water-closet purposes now in use. The Hellyer's patent water-closet with patent regulator sure-supply cistern, exhibited by H. C. Meyer & Co., New York, appears to possess several points of superiority in respect to simplicity of construction, cleanliness, and perfect flushing after using. This water-closet has been extensively used in England, and is being rapidly introduced into this country. Another form of water-closet called Hellyer's patent artisan hopper, also exhibited by H. C. Meyer & Co., is so arranged as to be automatic in its action, and is especially excellent for hotels, railroad depots, and other public places where persons using them might neglect to empty closets provided with the "pull."

The Jennings closet exhibited by Holmes & Webster, of Detroit, has had considerable popularity and is an excellent closet. It possesses some defects however, which prevent its being now considered a perfect water-closet.

The Rhoads' porcelain-seated hopper-closet* exhibited by H. C. Meyer & Co., is especially designed for hospitals, etc.; its excellence consists in its having a non-absorbent seat composed of porcelain, which necessarily renders it perfectly clean and inodorous. It is flushed from a tank operated by opening the closet door, or by a "pull." Either the H. C. Meyer & Co.'s patent waste-preventing cistern,* or the Rhoads' automatic flushing-tank can be used with this hopper. The automatic tank is preferable to use on this or any other hopper in places exposed to severe cold. The shape of the seat of the Rhoads' hopper prevents any person standing upon it, which is of especial advantage in some public places.

We have closely examined the Undershot Valve Siphon Discharging Trap, for wash-basins, bath-tubs, water-closets, and sinks. The object of this is to prevent the passage of sewer-gases up through the waste-pipes of water-closets, baths, etc., into the houses. When the waste-water is allowed to escape it raises by pressure a small valve situated in the bottom of a small chamber; this chamber then emptying by means of a siphon into the waste-pipe. Any gas rising in the pipe would enter the small chamber and from this it can find no escape save by going back into the waste-pipe and sewer; because the valve in the chamber opening upwards, the accumulation of gas would only tend to hold the valve shut. This appliance works automatically and requires no great care. The only fear that we have of its perfect work is that the valve may become clogged by small pieces of paper, etc.; but this objection will apply to all similar apparatus. We consider this the surest protection from the rise of sewer-gas in waste-pipes with which we are acquainted. This trap is exhibited by Charles Halstead, of 46 Vesey street, New York.

V. C. VAUGHAN,
LEROY PARKER.
Committee.

REPORT OF COMMITTEE ON ODORLESS EXCAVATING-APPARATUS.

To the Sanitary Convention:—Your committee appointed to examine and report upon odorless excavating-apparatus* respectfully report that it has examined the apparatus exhibited by A. L. Patrick & Co., of Detroit, being that known as the "National" Apparatus, and which is in daily use in Detroit, and your committee has been pleased with the simplicity of the apparatus and with the practical work of which it is capable.

It is a well-known fact that one injury to health from privy-vaults has been owing to the great difficulty in removing their contents in a cleanly manner, the removal creating a general instead of a local nuisance. This apparatus seems to obviate this objection. It is simple in construction and easily managed, and if used in the several villages and cities of the State would greatly add to the sanitary means of preventing disease.

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* [An engraving of the hopper-closet, of the cistern, and of an improved form of the odorless apparatus are on pages 19, 20, and 21, Report of this Board for 1879.—H. B. B., Sec. S. B. of H.]

A. F. WHELAN.
HENRY B. BAKER.
Committee.

REPORT OF COMMITTEE ON CULINARY APPARATUS.

The Committee on Exhibit of Culinary Apparatus submit the following report:

But one exhibit of culinary apparatus is made, that by C. Halstead, of New York. Several important features have been secured in the cooking-apparatus now on exhibition. That portion which comes in contact with food-materials being made of a good quality of porcelain, the following advantages are secured:

1. The apparatus is made of material which is unchangeable and insoluble in the liquids used in cookery, and hence incapable of communicating any poisonous or offensive material to the food cooked in such apparatus.
2. It is now made of a material which will not crack or scale, and will not permit the entrance of grease or fluid food-materials of any kind to decompose within the ware and destroy the palatability and digestibility of food cooked in it. This porcelain-ware will continue to secure public confidence so long as it is made of materials of excellent quality, but will decline in public estimation whenever a cheaper grade of earthenware is substituted in place of porcelain.
3. The food may be kept at uniform temperature during cooking, guarding against undercooked food on one hand and overcooked and burned food on the other hand.
4. All odors of food during the process of cooking are prevented, and "kitchen-smells" may be abolished.
5. The use of such porcelain-ware for storing milk, cream, and butter will aid in securing a good quality of these materials so prone to deterioration.

Respectfully submitted,

R. C. KEDZIE,
FANNIE E. DINGMAN,
EDWARD S. SNOW.
Committee.

Detroit, January 8, 1880.

REPORT OF COMMITTEE ON AIR-MOISTENER.

Your committee upon the Air-Moistener of I. W. Parmenter, report that it has been carefully examined, and the evils of which it is the proposed remedy being recognized and known, *i. e.*, the dry and over-heated air in rooms, especially steam-heated ones and those so heated occupied by students, and its claimed merits presenting a maximum of superficial area for water, and its evaporation in a minimum of cubic space being admitted, its use is recommended and the invention approved.

T. H. ACKERMAN,
Chairman of Committee.

COMMITTEE ON VENTILATION OF THE DETROIT HOUSE OF CORRECTION.

Your committee appointed to visit the house of correction and investigate the system of ventilation employed in that institution, and its general hygienic conditions, would respectfully report having made a brief examination of its conditions, and were very much gratified in finding it exceedingly well administered hygienically, and a very commendable change having recently been adopted in methods of warming and ventilation.

The old method of heating consisted in distributing along the lateral walls of the coridors coils of 1¼ inch steam pipe, furnishing fresh air beneath these, by a number of small circular openings distributed equi-distant beneath these coils, and just above the surface of the outside earth, with exhaust of foul air through round latticed openings in the ceiling and a vacant space beneath the roof, with little provision for escape therefrom, and that mainly through imperfect joints between the roof and walls.

Of course the only method of warming then in vogue was "direct radiation."

The present superintendent has extended ventilating-shafts from behind the several cells to and through the roof in some instances, and in others, utilized old neglected flues or shafts by placing within them gas-jets to rarify the contained air and thus induce an inflow below and a continuous exhaustion.

This supplies the needed exhaustion, while beneath and in front of a large window on either side of said corridors are placed large boxes made to fit the window closely, containing an abundant steam-coil and so arranged that on opening the lower sash of the window the fresh air is permitted to flow down behind an intervening screen and beneath this steam coil, and thence up through said coil to be discharged by a well-regulated opening at the top. The indirect system of radiation by which a goodly supply of not only fresh, but warmed air is supplied fully under the control of the person in charge.

This to your committee seems eminently practical and economic as well. The conditions of supply and exhaust have both received their proper attention, which conditions (either the one or the other), in our judgment, are far too often overlooked.

The experiment has found here a very economic yet effectual trial which we cheerfully commend to the careful consideration of any interested (as all are to a greater or less degree), in economic and efficient warming and ventilation.

The committee, owing to limit of time, found themselves unable to elaborate as careful report of the general sanitary conditions found that abundantly commend themselves to the careful observer, but would further mention with exceeding gratification finding a commendable dietary, together with unique and novel bathing-appliances by which each individual may be abundantly protected from the infections possible from common bathing-appliances.

C. M. STOCKWELL,
D. C. JACOKES,
GEO. E. RANNEY,
HENRY W. LORD,
GEO. B. RUSSELL.
Committee.

REPORT OF COMMITTEE ON SANITARY PUBLICATIONS.

Your Committee on Sanitary Publications respectfully submit the following report:

The State Board of Health exhibits its six Annual Reports, seven Registration Reports of Vital Statistics, and a number of smaller publications which have been prepared for free distribution, the principal of which are the two documents on the Restriction and Prevention of Scarlet Fever and of Diphtheria, Circulars Relative to Notices of Diseases which Endanger the Public

Health and Relative to the Work of Health Officers and of Local Boards of Health, Pamphlets on Treatment of the Drowned, Dr. Kedzie's Lecture on Healthy Homes for Farmers, and a book of samples of arsenical wall-papers.

The Annual Reports of the Board for 1877 and 1878, the Registration Report for 1873, and all the smaller documents have been furnished for free distribution during the meeting.

Mr. Jno. K. Allen of the office of the State Board of Health at Lansing, Mich., exhibits the publications of the Ladies' Sanitary Association of London, Eng., and of the Italian Society of Hygiene, of Milan. The Ladies' Sanitary Association was organized in 1857, since which time it has been in active operation. Their publications consist of sixty tracts and pamphlets averaging twenty-four pages each, of which more than 5,000,000 copies have been published and circulated by them, aggregating more than 120,000,000 pages. These publications, while scientifically accurate, are eminently practical and untechnical in character, and are written in such a style as to be interesting and easily understood by the common people. The present flourishing condition of the association indicates the large amount of good that has been accomplished by it. Mr. Allen states that through correspondence he has learned that steps are being taken for the organization of a similar association in New York City.

The exhibit of publications of the Italian Society of Hygiene consists of nine pamphlets on some of the most interesting and practical of hygienic subjects, together with a prospectus of the Journal of Hygiene.

Copies of the Plumber and Sanitary Engineer, edited by Chas. F. Wingate, are also exhibited, together with a neat pamphlet by the same author entitled Healthy Homes for Rich and Poor, for free distribution.

Respectfully submitted,
J. H. KELLOGG, M. D.
Committee.

The Rev. Dr. Jacokes, member of the State Board of Health, said he wished to add his personal approval of the system of ventilation adopted at the house of correction. He said he had made ventilation a subject of study and experiment for many years, and he was satisfied that the principle now in practice at the house of correction is the true principle.

The several reports were adopted. Votes of thanks were tendered to the presiding officer and to the secretary, to the press for the very full reports of the proceedings published, to the exhibitors of sanitary articles and appliances, to the citizens of Detroit for cordial hospitality shown to the convention.

After some pleasant remarks by Dr. Brodie, the president of the convention, and by Dr. Kedzie and others, the convention was declared adjourned at 6 P. M., January 8, all in attendance being well pleased with the session of the first sanitary convention, and regarding the work done by the convention as equal to the anticipations of its most enthusiastic friends.

C. C. YEMANS, M. D.,
Secretary.

PROCEEDINGS AND ADDRESSES

AT THE

SANITARY CONVENTION

HELD AT

GRAND RAPIDS, MICHIGAN, FEBRUARY 17 AND 18, 1880,

UNDER THE DIRECTION OF A COMMITTEE OF THE

STATE BOARD OF HEALTH

AND

A COMMITTEE OF CITIZENS OF GRAND RAPIDS.

SECOND SANITARY CONVENTION.

HELD AT GRAND RAPIDS, MICHIGAN, FEB. 17 AND 18, 1880.

For the convention at Grand Rapids the following announcement was made by Dr. Hazlewood, the secretary of the convention:

SANITARY CONVENTION AT GRAND RAPIDS.

TIME AND PLACE.

1. The second convention will be held in Grand Rapids, in the circuit court rooms on the 17th and 18th of February, 1880.

SESSIONS.

2. The convention will hold one session the first day, at 7 o'clock P. M., and three sessions the second day, at 10 A. M., 2 and 7 P. M.

3 During each session of the convention there will be one or more addresses or papers on some subject pertaining to public health, and of general interest, each paper to be followed by a discussion of the subject.

OFFICERS OF THE CONVENTION.

4. The convention will be presided over by a president and six vice-presidents, all being prominent citizens or eminent sanitarians, and there will be a resident secretary, to wit:

Rev. Geo. D. Gillespie, President.
Hon. Alonzo Sessions, of Ionia, Lieut. Governor, 1st Vice-President.
Hon. Henry H. Holt, of Muskegon, 2nd Vice-President.
Dr. E. H. Van Dusen, of Kalamazoo, 3rd Vice-President.
Mrs. S. L. Fuller, of Grand Rapids, 4th Vice-President.
Rev. J. Morgan Smith, of Grand Rapids, 5th Vice-President.
Dr. J. Andrews, of Paw Paw, 6th Vice-President.
Dr. Arthur Hazlewood, of Grand Rapids, Secretary.

EXHIBITION OF SANITARY APPARATUS.

5. Manufacturers of all kinds of sanitary apparatus or appliances are invited to send specimens of their manufactures for exhibition at this convention in accordance with the following regulations, viz.:

(*a*) The Board of Health reserves the right to decline any article not deemed suitable.

(*b*) A full description of each article proposed to be exhibited must be forwarded to the secretary of the convention with application for space.

(*c*) At the convention there will be no charge to exhibitors for entrance fee or for wall or floor space.

(*d*) Exhibitors will pay all expenses of transportation, storage, placing and removal of goods, and must themselves be responsible for any breakage or damage to their articles.

(*e*) Every article exhibited, and every model, drawing, or photograph must bear a descriptive label giving a detailed statement respecting its construction, use, and the price at which it can be furnished, and the name and address of the agent and the place of sale.

(*f*) Exhibitors may employ persons to explain their exhibits and properly to solicit orders.

(*g*) The position in the hall of articles entered by such exhibitor will be determined by the secretary of the convention.

(*h*) Exhibits will be received by the secretary of the second convention from January 15, 1880, to February 16, 1880, and will be placed in the hall before the opening session of the convention.

6. Competent judges will be invited thoroughly to examine the various articles on exhibition, and certificates of merit will be awarded to such as are deemed worthy of them.

7. The records of the proceedings of the convention, together with the various addresses and papers read and a catalogue of the articles exhibited, with the awards of the judges, will be published in the annual report of the Secretary of the State Board of Health. Reprints from that of the proceedings of the convention may contain several pages of advertisements for which there shall be charged the following rates, viz.: ten dollars per page or six dollars per half page, the prepayment of which sums shall entitle the advertiser to ten copies of the reprint and to receive other copies at cost.

8. The admission to all the sessions of the convention shall be free.

9. Programs for all the sessions of the convention will be printed and issued at an early day with the subjects and the names of the speakers or writers.

10. Invitations to be present at the convention will be sent, in the name of the State Board of Health, to many prominent citizens and eminent sanitarians from abroad.

SUBJECTS TO BE PRESENTED.

1. Opening Address.
2. Health of the Young as affected by Schools and School Architecture.
3. Conditions of Inflammability, with experiments.
4. General Sanitation.—Its importance to the public welfare, and a plea for better methods.
5. The Relation of the Clergy to Sanitary Reform.
6. The duty of the Christian in regard to the Laws of Health.
7. Drainage in its relation to Health.
8. Physical Development of Children.
9. Volunteer Papers.

The secretary will be pleased to give any further information.

ARTHUR HAZLEWOOD, M. D., 92 Monroe St.,
Secretary.

A card of invitation and program of exercises accompanied the announcement, as follows:

CARD OF INVITATION.

The Michigan State Board of Health cordially invites you to be present at, and to take part in the exercises of a SANITARY CONVENTION to be held in the rooms of the CIRCUIT COURT, in the CITY OF GRAND RAPIDS, MICH., February 17th and 18th, 1880.

The program for the several sessions of the Convention may be seen on the other side of this card.

Respectfully yours,
ARTHUR HAZLEWOOD, M. D.,
Secretary of the Convention.

PROGRAM FOR THE SEVERAL SESSIONS OF A SANITARY CONVENTION, FEBRUARY 17 AND 18, 1880.

First Session, 7 o'clock P. M., 17th.

Prayer by Rev. S. Graves, of Grand Rapids.

1st. Call to order and a statement of the purposes of the Convention. R. C. Kedzie, of Lansing, President State Board of Health.

2d. Opening address by the President, Rt. Rev. Geo. D. Gillespie, of Grand Rapids.

3d. A paper: "General Sanitation.—Its importance to the public welfare, and a plea for better methods." Henry B. Baker, of Lansing, Secretary State Board of Health.

4th. General discussion.

Second Session, 10 A. M., 18th.

1st. Reading the minutes of the previous session.

2d. The duties of the Christian in respect to the laws of health. Rev. J. Morgan Smith, of Grand Rapids.

3d. The laws of health in the physical development of children.

4th. Volunteer papers and discussion.

Third Session, 2 P. M., 18th.

1st. Reading the minutes of the previous session.

2d. The relation of the clergy to sanitary reform. Rev. J. F. Conover, of Kalamazoo.

3d. Drainage in its relation to health. Dr. E. H. Van Deuzen, of Kalamazoo.

4th. Volunteer papers and discussion.

Fourth Session, 7 P. M., 18th.

1st. Reading the minutes of the previous session.

2d. Health of the young as affected by the school and school architecture. Prof. E. A. Strong, of Grand Rapids.

3d. Some conditions of inflammability, illustrated, by R. C. Kedzie, of Lansing.

4th. Volunteer papers and discussion.

The following account of the Sanitary Convention at Grand Rapids is kindly supplied by Arthur Hazlewood, M. D., Secretary of the Convention.

HENRY B. BAKER,
Sec. State Board of Health.

FIRST SESSION, TUESDAY EVENING, FEB. 17, 1880.

The first session of the sanitary convention, conducted under the auspices of the State Board of Health, was held in the circuit court room. The room was uncomfortably crowded, a large part of the audience being composed of ladies.

The following members of the State Board of Health were present: Prof. R. C. Kedzie, President; Dr. Henry B. Baker, Secretary; Dr. H. O. Hitchcock, Kalamazoo; Rev. D. C. Jacokes, Pontiac; and Hon. LeRoy Parker, of Flint. Dr. J. H. Kellogg being in Washington, studying sanitary matters in the library, was not able to be in attendance.

Dr. Webb, of Lowell, and Dr. S. Belknap, of Niles, were also present.

Dr. Hazlewood, the secretary of the convention, read letters of regret from the following eminent sanitarians: Prof. J. L. Cabell, President of the National Board of Health; A. H. David, M. D., Montreal; Dr. T. A. McParlin, United States Army; A. S. Clark, M. D., Secretary State Board of Health, Springfield, Ill.; Henry I. Bowditch, M. D., Boston; Edwin M. Snow, M. D., Superintendent of Health, Providence, R. I.; Horatio R. Storer, M. D., LL. B., Newport, R. I.; Dr. H. A. Johnson, member of National Board of Health, Chicago; Dr. J. Berrien Lindsley, Treasurer American Public Health Association, Nashville, Tenn.; Dr. Wm. Brodie, Detroit.

Rev. Dr. Graves pronounced a noble invocation, after which Dr. Kedzie opened the convention with a short address, as follows:

OPENING ADDRESS.

BY DR. R. C. KEDZIE, PRESIDENT OF THE STATE BOARD OF HEALTH.

I see by the printed programme that it is made my duty to call you to order and to state the objects of this Sanitary Convention. I doubt not the question has already come to your minds, "What do we want a Sanitary Convention for?"

When anything gets out of joint with an Englishman, John Bull relieves his mind and sets right the wrong by writing a letter to the *Times;* when anything goes amiss with an American he calls a convention. With us a convention becomes the normal way of dealing with abnormal wrongs. We have conventions of Democrats, of Republicans, of Greenbackers; conventions of white men, of black men, of red men; conventions to advance agriculture, commerce, and manufactures; conventions of teachers, of editors, of doctors, of ministers; conventions for woman's rights and for man's wrongs.

We thus see that every general want and controlling interest in America, first or last, blossoms out into a convention. To round out and present full-orbed this whole matter of conventions, last month a convention of undertakers assembled in Jackson to determine the best methods to neatly and satisfactorily dispose of Americans when they have attended their last convention.

If we hold conventions to secure our political rights, to restrain public wrongs, to guard the social morals, to preserve our persons and protect our pockets, surely we may well hold a convention to discuss the *vital question* which underlies all these and without which they are of no value. The right to "life" precedes "liberty and the pursuit of happiness;" without life there is in this world no liberty, and the pursuit of happiness becomes an impossibility. So far as this life is concerned we never predicate health or sickness, joy or sorrow, of the dead. To say of any one, "he is dead", closes the day-book forever in which were so carefully entered the items of pleasure and pain, of sickness and health. But life itself is only a weary burden in the absence of health, because health is the basis of every earthly good. We instinctively recognize this in our daily greetings, for our first inquiry is concerning health.

We come together in this sanitary convention to repeat with new emphasis and enlarged meaning these words of friendly greeting, "How are you?" "How do you do?" How you are will determine largely what you will do and how you will do it. We are not completely ourselves except in health, for health is the condition of being whole, or hale. We were made for health, and it is a physical sin to be sick. But it is difficult if not impossible to preserve perfect health amid general sickness. All must assist in preserving the public health, in order that any may enjoy perfect health. In the broadest sense, every man is the keeper of every other man, and to keep his brother safely is the first condition of his own safety.

There are many causes which undermine the public health which people fail to recognize till they are distinctly pointed out; the removal also of such causes requires the united action of many. We need to come together and talk over these matters; we need information on a great many points, but the best way to get information is to freely impart it. The golden maxim of Christ holds true in every relation of life, "Give and it shall be given you." If you want a blow, give a blow; if you want love, give love; if you want information, give information. Upon how many matters we all need to be informed in order that we may dwell securely! It is true now as it was in the days of Hosea, "My people are destroyed for lack of knowledge."

There are a great many facts scattered among the people which, if brought together and placed in their proper relation to each other, would greatly increase our fund of sanitary knowledge, but they are of small value unless gathered and compacted into a scientific truth. There are grains of gold scattered everywhere among the gravel hills which line the Grand river, but they are valueless because thus scattered; gather them and fuse them in the crucible into one mass, and you have an ingot of gold. So is it with the scattered grains of truth.

In this convention we want to secure the *hearty co-operation of every person*, because we seek a common good. We want the help of the ministers, merchants, doctors, and citizens; but above all we want to secure the wise counsels, the ready zeal and the deft hand of woman in this work, for we shall only succeed by her hearty co-operation. Let us lift ourselves in this Christian age at least to the level of heathen Rome, whose maxim was, "*Salus populi, suprema lex,*"—the safety of the people is the highest law.

Dr. Kedzie then introduced the Rt. Rev. Geo. D. Gillespie as the President of the Convention. Bishop Gillespie took the chair and read an address in the following words:

PRESIDENT'S ADDRESS.

BY RT. REV. GEO. D. GILLESPIE, OF GRAND RAPIDS.

LADIES AND GENTLEMEN:—I have been asked to preside at the sanitary convention of the State Board of Health. Why one whose life is apart from the public interests of the city, who has no name to help a meeting of this nature, should be asked to take the chair, is a private matter with the seven honorable gentlemen whom the State recognizes as the State Board of Health, in which you and I have no right of investigation. Should I venture an inquiry, I might return answer to myself, that my only State honor and record being a man often sent to prisons, reformatories, and jails, and found in insane asylums and poor-houses, a transfer from the malaria of crime and poverty may be deemed a sanitary measure worthy of a State Board of Health.

Am I right in this conclusion, I will return the compliment by expressing the satisfaction with which the State Board of Corrections and Charities, which I may humbly represent, will welcome the Board of Health collectively or individually, in Jackson, Ionia, Lansing, Pontiac, Kalamazoo, Coldwater, or any minor State institution for criminals or paupers.

I must own an *obligation* of profound interest in the proceedings of this convention. You nor I can understand a ministry of souls of men that is dissevered in sympathy and in exertion from a ministry for the bodies of men. The Lord, to whom in his God-being we look for authority of office, from whom as man dwelling among us, we derive the pattern of our service, won the title of the Great Physician, and marked his life by a ministry of healing the body, as distinctively as by instructing and comforting the soul.

Christianity brings the divine love to earth to dwell in the human heart and direct the human hand. That love is pity, tenderness, kindness for every form of human suffering in whomsoever it may be, wherever it may be in him. A man for God's special work on earth, is one to whom all forms of sorrow of the human being come as to their own. He is a helper in intense devotion to mankind as sojourners here, as to mankind with the promise of the eternal God, of life unending. We know no such "conversation in heaven," as that the immortal, the spiritual, may do the despite of inattention to the material, the temporal. On "Depart in peace, be ye warmed and filled, notwithstanding ye give them not those things which are needful to the body," the turning off the duty with the blessing—comes the Anathema Maranatha, whether the pain or penury of an individual or the sanitary perils and pestilences of a community, a State, be thus neglected.

Call on your ministers of the altar, aye call them from the altar, if need be, when there is an evil in the city such as your Board is bound to notice, and as ministers of *Christ* they will hasten, submissive to his authority, animated by his spirit. When a member of your Board, who had the kindness to respond to my invitation to address our clergy at Allegan, told them that you desired to interest clergymen in your work, he placed the obligation where, wherever else it may belong, it must have official recognition.

And here let me note to the credit of the State of Michigan, that recognizing the clergy as a body devoted to the interests of their fellow-men, nor fear of priesthood, nor prejudice of caste, prevents the appointment on her State Boards of gentlemen with the prefix Reverend.

A State Board of Health! Disease, sickness,—I shall not ring the changes on what is not agreeable,—is a great factor in human life in all its relations. No doubt sickness is capital in trade with us poor mortals, who, while we complain of the sorrow we are born to, are always multiplying it.

> "The surest road to health, say what they will,
> Is never to suppose we shall be ill;—
> Most of those evils we poor mortals know,
> From doctors and imagination flow"—
> (*Churchill's Materia Medica.*)

may be very good for some of our friends who annoy the doctors as much as they annoy us. That dear old lady who never heard of a disease but she had had it, and when there was recited to her a long list of maladies that never came on a bill of mortality since the world began, good old soul, she had come near dying with every one, is a typical person.

Sir Philip Sydney's—

> "The ingredients of health and long life are
> Great temperance, open air,
> Easy labor, little care,"

would do very well to frame and hang up in daily sight of the family; but in the first place, few could take the preventive; and in the second, many taking it would be sick and die prematurely notwithstanding.

Sickness has its imposing statistics in the business way. Why, if we should walk down our Monroe street noticing doctors' signs and apothecaries' colored bottles (the undertakers are on side streets), by the time we faced the clock we should imagine that we had at least one of the diseases in Milton's doleful list.

I have just been looking into the census of Michigan. I find that there are 2,337 physicians,—but there must be some mistake, only one doctor to 507 people,—impossible.

But the grand argument is from the people who need the doctoring, whether they have it or not. Did it ever occur to you that our common, "How are you?" "How is your health?" comes of the exceptional condition of health? In the judgment of charity one should be well rather than ill. I have sometimes thought that it would be well to introduce a new style of greeting that has in it neither health nor sickness. But I fear I could not get a patent.

Seriously. Look into the families of your acquaintance. Listen to the talk at a tea-party or a church-social. Look into your last year's expense list. Look at the bottles with their labels in your closet, or as the doctors would say, look at people's complexions, their tongues, and feel their pulse.

It is time that we bring our desultory remarks in close connection with the occasion. What are the causes of this everywhere prevailing weakness and suffering of the body, the masterpiece of God's material creation, and of these local visitations of some form of disease? That is a question for the doctors to answer in full. Only this may be said outside the profession, that the conditions of health and sickness are very largely beyond the person. Your wise medical man summoned to your bedside, if he knows the tendency of your family to pulmonary complaint, or finds the symptoms of common disease, needs no observation beyond; but if he finds a form of fever, or looks into the throat to read as in print the terrible diphtheria; while he may only comment on the weather that has characterized the season, more likely he institutes an inquiry that reaches into your well, your cellar, your sewer. And when case after case of certain disease occurs in a district, that district, gentlemen of the Board, falls under your scrutiny, generally, as your reports show, with clear determination of causes.

So it is established that there may be conditions of air, water, articles of food, manner of eating, and habits of dress and living, that are eminent causes of disease to the individual, the household, and the community. In the introductory address of Dr. Hitchcock, the President, in 1873, he states: "At a low estimate, there might be saved to this State, if the people were properly instructed in and would carefully observe the principles of hygiene, 2,000 lives that are now annually sacrificed by ignorance and neglect. The State loses in treasure by preventable sickness $2,000,000 per annum, to say nothing of the cost of burying the dead." President Kedzie in his address, in 1878, remarks to the same effect: "Not only sanitarians, but the people at large are grasping that very important and revolutionary idea, *the possibility of the prevention of sickness and death*, that many diseases may be prevented altogether, or that when they do appear, they may as certainly be stamped out as a forest fire may be extinguished, or they may be walled in like an inundation. Half of the sickness and half of the deaths of a people may be prevented or avoided as truly and as really as they may prevent the destruction of their crops by cattle by proper fencing."

Now here comes in the work of the Board of Health. It is an investigator with intelligence, with authority. It works with any local board of health, and it works beyond it. Where there is evil in a city or district, it holds inquest with the broadest investigation; it does more, it is well posted in causes of disease, and anticipating the danger puts up the sign-board of alarm in advance of anything but alarm. It is an "old probabilities," that makes its guesses out of good material. It is a great statistician with the good kind figures that tell us where danger lurks, and how we may live happy and long. In this relation it "has begun to gather data which shall exhibit the physical conditions, in this State, relating to health and disease, the water-supply, the forest-growth, drainage, natural and artificial, temperature, rain-fall, etc." And it proposes "a study of the entire records of sickness of the people, the causes, concomitants, tendencies both immediate and remote."

Let me read you a partial list of the standing committees of the Board:—Epidemic, Endemic, and Contagious Diseases; Sewerage and Drainage; Food, Drinks, and Water-supply; Disposal of Excreta and Decomposing Organic Matter; Geology and Topography; Influence on health, of Forests and their Removal; Shade Trees near Dwellings; The Death-Rate as influenced by Age, Climate, and Social Condition; Mental Hygiene.

A State Board of Health has even a more comprehensive mission. The law decrees, "The State Board of Health shall have the general supervision of the interests of the health and life of the citizens of this State." The intelligent members keep a watch of "fatherly goodness" over the million and more souls composing the State family. The Board have a care for your public buildings, that they shall not be death-traps in the event of sudden conflagration or alarm; for your school-houses, that your children's minds shall not be enriched to dwell in impoverished prematurely perishing bodies; for your homes, that there shall be no poison of sewer-gas, no germs of disease in the adorning of your chambers, the heating of your dwelling. The Board propose to instruct you in "poisons, explosives, chemicals, accidents, as special sources of danger to life and health."

This charitable work will be more fully told in a list of some of the papers that from time to time have been printed in the annual volume: Illuminating Oils, Poisonous Paper, Hygiene of School-Buildings, Impurities and Adulterations in Table Syrups, Draining for Health, Resuscitation of the Drowned, Meteorology of Central Michigan, Use of Poisons in Agriculture, Trichinæ, Influence of Occupations upon Health, Ozone, Means of Escaping from Public Buildings in case of Fire, Criminal Abortion, Ventilation of Railroad Cars, Heredity, Recreations and Health, Infant Diet, Baths and Bathing, Contributions to the Study of the Spread of Diphtheria, Special Danger near Railroad Switches, Lead-Poisoning, Wood Pavements and Sidewalks, the Opium Habit, Preservation of the Teeth.

Such a paternal Board could not be unmindful of what the people of Michigan eat. Here are words from the Address of the President, in 1878, to make every traveler and tramp ready to bow with profound gratitude often as the Board of Health is mentioned: "The question of food and its preparation for human use has more vital relation to the health and welfare or our people than all other physical causes combined. Badly-cooked and ill-digested food is the cause of more ill-health, waste of time, loss of effective labor, whether muscular or mental, than all the combined diseases of adult life. If our people could be taught to preserve and to prepare their food so as to secure the best dietetic results, preventive medicine would have won a grand victory. It could no longer be said that our appropriate monument would be a frying-pan and our epitaph, salaratus." Oh, beloved Board of Health! In mercy to all tramps and travelers, all boarders and traveling preachers, print those words with elegant type in colored letters and scatter them as complimentary gifts.

Is it asked now why the State should undertake to be general physician and parent to her citizens, guarding them from harm and ministering to them in distress? What mission more appropriate has the State? Shall she punish and not preserve her citizens? Shall she provide for them impaired in body or mind, and neglect the watch and ward that will keep them off her hands? And who but the State, with her inherent powers, her facile legislation, her pecuniary resources, can do this work that lies in all her area, and is beyond the anxiety and benevolence of her citizens? The group of State Boards—the Board of Corrections and Charities, of Education, of Agriculture, of Health, has perfect harmony, when we regard the State as made for her citizens and not her citizens for the State.

Ladies and gentlemen, I have taken the view of an outsider. I have laid before you the information I have sought for myself. Pardon me if I have erred in supposing that to you as to myself, the State Board of Health suggests inquiry rather than conveys information. Should the program in your hands, or anything you have already heard this evening, induce your attendance during the conference, no doubt you will even partake in the enthusiasm which animates the members of the Board. Ladies, as to your interest and relation, the Board will make its own plea. The President in his address, 1878, remarks, "In carrying out any sanitary reform we need and must have the aid of the women of our State. * * Whether we regard the objects of sanitary science as the removal of the cause and limiting the spread of diseases, or as the improvement of the physical condition of the people, in either work we need woman's helping hand. * * In the introduction of most sanitary reforms among the people, we must rely upon the active, hearty, and intelligent co-operation of women."

Those of us who have taken in the keeping of our interest and effort, the degraded and criminal classes of our communities and State, cannot fail to find in this Board one of the efficient helpers we are seeking. We know how vice is associated with all conditions of physical derangement and depression. We believe in the pure atmosphere in reality as in figure.

We have no doubt that better habitations for the people have the promise of better habits in the people. Social science to-day is busy digging and delving, working in the physical, to set men free from the rule of their passions, and raise them to a life of benefit to themselves and safety to others. As a State Board of Corrections proposes to reform the criminal, so a State Board of Health to prevent the criminal.

When we take a higher standpoint, such work as this Board so energetically pursues has no less lustre. From an able article in the Princeton Review, by Prof. Blackie, of Edinburgh, on Home Evangelization, we extract: "On the one hand heathenism is caused and aggravated by the prevalent arrangements for the sale of strong drink, and by the drinking-customs of society; by crowded dwellings, want of ventilation, and the means of cleanliness; by needless hindrances to marriage, or by neglect of right family arrangements, as when the mothers of young children work in factories, letting out their children to others to tend; by want of training in domestic economy, whereby the housewife often enters on the charge of a home without knowing how to make it comfortable; and generally by habits of thriftlessness, untidiness, and want of foresight. Wherever such evils have established themselves, they are found to constitute most serious obstacles towards the evangelization of the people. * * Those who are deeply concerned for the regeneration of the lapsed classes cannot but seek to assail these social evils, or to have them lessened by means of the weapons which the civil authorities are able to wield against them." Every burden of poverty, whether it be the demand on the taxpayer or the painful appeal to the sympathies of the tender-hearted, finds relief in the intelligent working which the reports before us detail.

Were it necessary, we could easily present the argument of interest and obligation to every calling and position. It were improper for the layman to refer to the duty of the physician, a duty with capacity recognized in the M. D. attached to four of the seven names of the Board. We have touched on the obligation of the calling whose daily walks are in the shaded places of sickness and poverty, and the coöperation of the teacher may be bidden with almost equal force of need and obligation. No where has this Board been more busy than in the school-house. Upon the children of the State it has cast an eye of fatherly regard, and if the errors of the past are repeated and the work of the teacher discouraged in the ill-ventilated rooms, of painful, dangerous ascent, in stylish buildings set on hill-tops and hill-sides, it is because the people have turned away the ear from their State teacher.

Emphatically is this Board the friend of the people. Wealth may make its own surroundings. It is the people in thick-set dwellings, on narrow streets, or located in new additions to the town, the people to whom cheapness rather than quality is the law of purchase, the people who may not retire from the infected district, who need this kind oversight, and who should welcome these generous offices of the State.

Ladies and gentlemen, I am detaining you too long. It will be my aim to preside over this conference not so much for its parliamentary rule as to its practical efficiency. A chairman, at best, is but a figure-head. In the carefully drawn program now to be carried out and in your presence and participation will be the value of the conference with which our city is honored.

Dr. Henry B. Baker, of Lansing, Secretary of the State Board of Health, was then introduced and read a paper relative to General Sanitation, as follows:

GENERAL SANITATION,—ITS IMPORTANCE TO THE PUBLIC WELFARE, AND A PLEA FOR BETTER METHODS.

BY HENRY B. BAKER.

The subject of general sanitation, assigned to me by the committee, is one so wide in extent, and so profound, that I cannot hope to do justice to it as a whole; therefore, realizing the fact that a long and heavy load is frequently lifted with greatest ease when only one end is required to be raised at a time, and especially that when one end of a load is already well raised the most important work is the raising of the other end, I have decided to glance at the general character, scope, and importance of the work, ask more particular attention to such parts as in my opinion are most sadly neglected in Michigan at this time, and plead for better methods, and more methods than are now employed, especially in certain neglected departments of general sanitation. In doing this, it seems almost essential to consider the character, necessary acquirements, and duties of those who are to do sanitary work; and these are the officers and members of local boards of health, particularly the health officers.

The end of the general subject assigned to me which I propose to lift on at this time, in accordance with the expressed wish of the committee and with my own judgment, relates mainly to the restriction and prevention of those diseases which, by being communicable, endanger the public health, and whose causes, modes of communication, and best methods of prevention are not generally well understood. It may be said in passing that the department of public sanitation which I consider to have already received the greatest attention is that which relates to general cleanliness, the removal of filth, in the many disagreeable forms in which it has forced itself upon public attention by reason of its intrinsic power of odor or unsightliness. Such nuisances exhale powerful arguments for their own abatement, and although there is yet room for an immense amount of work to secure their removal, those who habitually resist or disregard such arguments are lower in the scale of civilization than are they to whom I appeal for the restriction and prevention of communicable diseases, and in regard to other less recognized sources of disease. Some of the dangerous agents to which I wish to call your attention are the contagia of diseases. These are just as real as are the evident nuisances, but they are as a rule invisible to the naked eye; and, though they sometimes generate odors, they are themselves usually without odor. And yet, though their power is not evident to the unaided senses, the earth is strewn with the dead because of these disease-germs, and all our paths of life are peopled with crippled victims of the many communicable diseases which we neglect to prevent or restrict.

NEW REQUIREMENTS AND DEFINITIONS OF CLEANLINESS.

In speaking of the greater importance in the prevention of diseases, of other work than that for the suppression of ordinary nuisances, the question has been asked if I was not forsaking the time-honored doctrine that all our ills are due to filth, and that the single word *cleanliness* expresses the whole sum and substance of general sanitation. To this I reply that very considerable progress has been made in our accurate knowledge respecting the causes of many diseases, and respecting the conditions essential to different kinds of cleanliness. To illustrate this, it may be sufficient to suggest different standards of cleanliness, as follows: The housewife has one standard of cleanliness, which requires that a dish for the table must be thoroughly washed with soap in hot water, rinsed with clear water, and drained or wiped dry with a clean cloth. If such a clean dish be given to the chemist for his most accurate work, he may object that the dish is not chemically clean, and he will rinse it in alcohol or in a strong acid or a strong alkali, according to the particular form of matter which he fears makes it unclean for his purposes, and after rinsing and wiping or drying it, he also will pronounce it clean. If this same dish, which has been made clean enough for the chemist, be given to the biologist who is experimenting on the vitality or reproduction of bacteria, he will pronounce it unclean for his purposes, and he will not be satisfied until he has submitted it to boiling water for at least five minutes, or in dry air to a temperature of 240° or 250° F., and then he will require that it shall not be exposed for an instant to the ordinary air, for fear of its contamination by germs which sometimes float in the air. He will insist on these conditions because he has found by experience that ordinary cloths, ordinary air, and ordinary water generally contain bacteria, spores, or germs capable of reproduction under favoring conditions, and sometimes contain germs capable of reproduction in the bodies of human beings, and of causing such diseases as small-pox, scarlet fever, diphtheria, etc. The experiments by Tyndall, Burdon-Sanderson, Pasteur, and others on the conditions of life and reproduction of bacteria are of very great practical importance in studies for the prevention of diseases, because they show the facts concerning lower organisms similar to those which are found to multiply in the human body during the course of some of the communicable diseases, and because they tend to reinforce our knowledge of methods of destroying the contagia of some of those diseases, such, for instance, as the virus of small-pox and the contagium of scarlet fever, which are found to be destroyed under some of the conditions just stated—as by exposure in dry air to a temperature of 250° F. Further experiment may show that a lower temperature is sufficient; and this is to be expected, because of the comparative infrequency of extensive outbreaks of these diseases in the hot summer weather, and also because of the liability of vacine virus to lose its activity during the heat of Summer. Returning to our clean dish, which with a little variation might as well have been a clean article of clothing direct from a laundry, or even new goods from a store, I think it is now plain that what is perfectly clean according to one definition, may be very far from clean according to this view of the subject, and with great certainty may convey the unseen causes of disease to any susceptible person.

NEW METHODS OF SANITATION DEMANDED.

What has just been said makes plain the necessity for new methods of sanitation. It may be well briefly to recapitulate these reasons in a slightly different manner, in order that they may more easily be kept in mind: one essential fact to be noticed is that although the causes of the communicable diseases are material, "particulate" as it is said, they are invisible to the unaided eye, and consequently our ideas of cleanliness must be so cultivated that we can, in imagination, follow the dissemination of the specific contagium which we know exists, whether it spreads through the air and is taken in with the breath, is conveyed from hand to hand in shaking hands, from lip to lip in kissing, from person to person by means of clothing, from one place to another in clothing, new goods, boxes or trunks, or in whatever way it is carried from place to place; or in whatever manner, as, for instance, by the saliva or expectorations of careless workmen or inmates, it is kept in houses or hospitals.

DISEASE-GERMS,—THEIR SIZE, DISTRIBUTION, ETC.

One who has never seen in the microscope the "particulate" germs of disease may be aided in such a scientific use of the imagination as has been suggested, by fixing his attention upon a form of contagium in mass sufficient to be appreciable to the unaided eye. In the small-pox vesicle we have the contagium of that disease in considerable quantity; and bovine vaccine virus, as we all know, contains the contagium of cow-pox. If we imagine this to be made up of minute granules, of rounded outline, so minute that twenty thousand of them will be required to cover an inch in length, we shall have an idea which will aid the mind in following the course and spread of disease-germs of this nature. We can then easily understand how such disease-germs may be floated off by the air, carried in a veil, scarf, or handkerchief, be stored or conveyed in the clothing, beard, or hair, appear as dust in a room, be sent in a letter or a paper, be boxed up and transported to a distance, washed off in water, carried into a privy, pass through the entire length of a sewer or the water-pipes which supply pure water, go in the milk-can on its round from house to house, or with the delivery-man from the grocer, baker, market, or laundry. This may serve to give us an idea of some of the problems with which the health officer has to deal in connection with the restriction and prevention of communicable diseases and some idea of—

WHAT A HEALTH OFFICER SHOULD KNOW.

An efficient health officer should have clear ideas of the nature of contagia; he must have a good practical knowledge of the means by which and the manner in which they are disseminated; he should know the conditions of their reproduction, within or without the body; he should know the conditions of their existence outside the body; and especially of their destruction, for upon this, in connection with what has just been mentioned, depends his success in restricting or preventing communicable diseases.

A MEDICAL OFFICER OF HEALTH.

Some of the cities in Michigan do not obey the law which requires that the health officer shall be a physician. No man can be of much use as a health officer unless he has a good knowledge of biology, at least of the general principles. We might better put a blacksmith in charge of a milliner's shop than to choose as our health officer one who does not understand the nature of those vital actions which human bodies undergo in health, and of those processes which are coincident with disease. While much of the knowledge of the physician is entirely inapplicable to the work of public sanitation, and while this work demands of a health officer much knowledge which the ordinary physician has had no occasion to acquire, still the fact remains that in order to become a useful health officer one must have had a thorough training in the biological sciences which lie at the foundation of the medical sciences.

A health officer should be sufficiently familiar with mycology not only to know that certain kinds of fermentation are ordinarily harmless, and certain other kinds are generally harmful, but he should know how to stop the harmful fermentations. Inasmuch as nearly all the ferments are invisible to the naked eye, a health officer must have an educated imagination in order to deal successfully with his every-day work. This is so because much of his work should be a battle with some of the special ferments. Perhaps I can make this plainer by briefly outlining what, in the present state of our knowledge, seem to be essential facts in this connection. Active cells in the human body act as ferments, destroying organic matter used as food and creating special products differing according to the function of the particular organ in which the action takes place. In the healthy adult, the requirements seem to be mainly to get from the food employed force to use in brain-work and muscle-work, very little being then required for growth or development of the body, so that the process is one of destruction through fermentations which yield force, for the purposes of life, and poisonous products which should be thrown out of the body as fast as formed, and which should not be again taken into the body. A health officer should endeavor to see that all is done that can be done to prevent their being supplied to the people again in the water they drink, the air they breathe, and the food they eat.

Immediately upon entrance into the mouth of a healthy adult person, starchy articles of food are attacked by one of the useful body ferments, in the saliva, and starch is converted into one form of sugar. And here, upon the very threshold, as it were, may begin the battle between useful and harmful ferments; indeed it may begin in the food before it is put in the mouth, for the yeast which the cook puts in the dough may contain other ferments than the harmless yeast-plant, and therefore the bread may contain not only the *products* of other ferments than yeast proper, but also the special ferments themselves, multiplied greatly in number since they left their home in the foul air or water. So, also, with the meat, which though not easily fermented by the yeast-plant, is decomposed in a manner somewhat similar, by bacteria and similar low organisms, microscopic in size. And here the product is not so frequently sugar and alcohol, but sulphuretted and phosphoretted hydrogen, butyric and carbonic acids, ammonia, etc., usually bad-smelling products; and the bad odor of the product should warn us of danger from those germs which cause decomposition.

In order better to appreciate the importance of the subject, perhaps some other of the useful ferments of the body should be mentioned. We have noticed only the first one encountered by the food in the saliva of the mouth. The food meets another in the healthy stomach, another in the secretions from the pancreas, and so on in different parts of the body. Suppose each and every one of these natural ferments in the body has to divide the food with another special ferment which goes into the body with the water or food, or enters the blood in some other way, as is believed to be the case in most communicable diseases. Suppose that special ferment to be the one which causes small-pox, the one which causes diphtheria, or the one which causes typhoid fever. We can thus see how the gases given off by the lungs, and how the other excretions and the secretions of the body may all contain products not naturally present in them, and a person not only have a fever but be "sick all over"—in every part of the body. The character of the sickness, from a communicable disease, depends, as we know, upon the particular special ferment, but we need to guard, and to have our health authority guard us, against danger from every one of these dangerous ferments.

A HEALTH OFFICER NEEDED FOR EVERY LOCALITY.

It is important that all classes of people understand what needs to be done by the health officer, because he is a public servant dependent upon all classes of people, sometimes for his official position and always for that coöperation which will render his efforts most effective. If the people of a locality do not think of anything for a health officer to do they will not be likely to employ one, except as a form in order to comply with the State law, and will then endeavor to get the cheapest man. A prominent newspaper in Detroit states the case as follows: "It is doubtful if any board of health, howsoever elaborate and costly, could at present improve the public health of so healthy a city. While, therefore, we may be compelled to have a health officer, as the law seems to require, to report our vital statistics to Lansing, the common council should take care that he cost as little as possible, and meddle as little as possible with the people's private affairs."

The writer of that paragraph assumes that Detroit is a healthy city. I know of no way of proving what he assumes, because the city has no reliable vital statistics; but the reports of burials in the city cemeteries indicate that the deaths from communicable diseases are about two hundred and forty every year. How long must this slaughter go on before it will attract the attention of the newspapers? When General Custer's little band, of about the same number as this, was destroyed, the news thrilled the people of this State with an awful anguish; but in Detroit there are two hundred and forty deaths from preventable causes *repeated* every year, and that city so healthy that its only need of a health officer is "to report our vital statistics to Lansing"; and the council is asked to hire a cheap man to do that. This illustrates the necessity for more accurate and more *general* information concerning the deaths and the causes of deaths which are now permitted to destroy people by the hundreds, without attracting sufficient attention to start efforts for their prevention. We need vital statistics, and we also need to act up to the knowledge we already have as to methods of preventing the communicable diseases.

HOW DO HARMFUL FERMENTS ENTER THE BODY?

In order to be able to guard us from the communicable diseases, the health officer should know the sources of danger, and the probable ways in which different diseases enter the body. Much remains to be proved in this field of study, but concerning certain diseases there is much that seems well established.

TYPHOID FEVER.

There is good evidence that the greatest danger from typhoid fever comes from what goes into the stomach, and not from the air taken into the lungs, and that of all sources probably the most frequent is water contaminated with the discharges from persons who have had the disease, though an epidemic of about 200 cases in Germany has been traced to the eating of the meat of a calf which had probably been affected with the disease. The poison of the disease seems to be reproduced in the intestine and not usually on the outer surface of the patient. In typhoid fever, then, the health officer need not quarantine or isolate the patient, for it is not common to have the disease spread by breathing the same air in which the sick person is; but the health officer should carefully superintend some of the details in every case of typhoid fever. He should require the discharges from the bowels of the patient to be thoroughly disinfected, and not permit them to go into any accumulation of excreta from whence they may eventually return to plague the human race.

It has been thought that typhoid fever has sometimes been caused by breathing in the ferment given off from decomposing organic matter; and diarrheal diseases have been known to be caused in a similar manner, although it has not been demonstrated that the ferment was itself inhaled. Generally we have a right to assume, however, from the evidence of observed facts, that wherever we find the odors of decomposition in connection with organic matter, there also are the special ferments of that particular decomposition, unless unusual circumstances have caused a separation; for the bacteria of decomposition are exceedingly minute, and they or their germs appear constantly to float in the air of foul places. The health officer should be required to search out all such places and to abate any such nuisances. By means of lectures and circulars, and otherwise, he should instruct all classes as to the best means of preventing this disease. If he prevents typhoid fever he will prevent about five per cent of all the deaths which now occur from all causes; and he will save his city from a great waste of life and money.

SMALL-POX.

Small-pox is now usually of little consequence, as it does not cause many deaths in intelligent communities, and its prevention is easy by timely vaccination and revaccination. But it is worth while to understand that its cause probably does not usually enter the body as does that of typhoid fever—by the mouth—but that the special ferment is generally inhaled with the air we breathe. And the special ferment is reproduced on the outer surface of the patient. It is therefore important to isolate persons who have small-pox, and to destroy or disinfect not only the discharges but everything which has been in a room with a person sick with that disease. An active health organization in a city where people are generally intelligent, should, in this enlightened age, be ashamed to have an epidemic of small-pox. I am informed that in one city in this State where there is a paper-mill, seldom a year passes that a case of small-pox does not occur; but the intelligent health officer generally restricts it to the first case, and has never had more than two or three cases in one outbreak.

SCARLET FEVER.

Scarlet fever is a disease of much greater importance in this State than is small-pox. Whenever our health authorities shall protect us from scarlet fever we will be spared a very considerable proportion of our present death-rate and a vast amount of suffering which now follows children through life; for scarlet fever leaves many who linger on through years of imperfect life. In this disease, as in small-pox, the special ferment seems to be reproduced on the outer surface of the body, perhaps, also in the throat and throughout the body, so that the discharges and everything which comes near the body should either be disinfected or destroyed.

DUTIES OF THE HEALTH OFFICER IN CONNECTION WITH SCARLET FEVER, ETC.

The health officer should, next to the attending physician, be the first to visit the premises where scarlet fever occurs, and, in the interest of the community, should superintend and enforce measures for the restriction of the disease. The physician is employed and paid only for the benefit of the family who employs him. If the community expects to have its interests subserved, it must employ and pay some one to attend to them. The health officer should put up a notice, to warn those who might otherwise enter into danger. He should leave with the family plainly printed instructions, and before he leaves he should make sure that the methods for the restriction of the disease are understood by the family. A city might even better pay skilled nurses to remain with the sick, with a view to preventing the spread of the disease, than have such a disease as scarlet fever spread through the city, with all the chances for its germs to remain for all time to come, to break out again whenever a sufficient number of children come to be of the most susceptible age.

DIPHTHERIA.

Diphtheria is another disease which is being allowed to destroy the children in this State, in some parts of the State without any proper effort for its restriction. Its special poison is believed to enter the body by way of the mouth and air-passages, and to be communicated by whatever comes in contact with the exhalations and excretions from the body of the sick person.

In the restriction of diphtheria, and of the other communicable diseases, except small-pox, which can be modified or prevented by vaccination, there is a great and generally neglected field for active work by our health authorities throughout the State, and in every year. About one-eighth of all the deaths reported in this State are reported as caused by the communicable diseases. Among these diseases few cause a less number of deaths than does small-pox, but, aside from vaccination, the methods adopted for its restriction are generally applicable to all the others, except perhaps typhoid fever, of which mention has already been made.

THE ECONOMY OF HAVING A HEALTH OFFICER.

The State Board of Health has the names and postoffice addresses of over 3,500 physicians in Michigan. I think it is safe to estimate that the average annual income of these doctors is at least $1,000.00 each; and, if so, the people of this State pay $3,500,000 a year to those whom they employ to prescribe for the sick. If in respect to sickness we admit that an "ounce of prevention is worth a pound of cure", one-sixteenth of $3,500,000 ($218,750) judiciously expended in the prevention of sickness would be worth as much to the people as the whole sum spent for the cure of sickness; or if the whole 3,500 doctors were employed and the whole $3,500,000 expended in the prevention of sickness, the benefit to the people would be sixteen times as great as now and would have a money value of $56,000,000. And yet not all the sickness is preventable. The debt of nature must be paid at last. When science has failed to prevent sickness the skillful physician can often aid in nature's efforts to recover strength, and when death is certain he can often make easier the last days of suffering. But can any rational person suppose for an instant that if one-sixteenth of the 3,500 physicians now employed in prescribing for the cure of disease were constantly employed and paid for their services and their success in searching out and applying all possible knowledge for the prevention of sickness and deaths, it would require near all the remaining 3,282 physicians to prescribe for the sickness which would not thus be prevented? Can any one suppose that many of the present heavy burdens of the people would not be removed?

Omitting mention of the most important direct benefits of the prevention of sickness, and noting only the indirect benefits not so frequently dwelt upon, let us think of the vast sums of money now paid to maintain poor-houses, hospitals, insane-asylums, asylums for the deaf, dumb, and blind, jails, and even prisons; much of this expense would then be entirely unnecessary; and many of the causes for demands now made for private charity would not exist; thus, as I believe, not only our personal expenses but our State, county, and municipal taxes would be materially lessened, the prosperity of our people would be something wonderful when compared with our present condition, and the phrase "Life, liberty, and the pursuit of happiness" would have its first and last terms wonderfully emphasized.

There is no reason to fear that we should suffer for want of doctors, even if we were to ask every one of those now practicing to change his employment to the prevention of sickness. If more were needed I think they would be forthcoming; but suppose every one of the 1,261 local boards of health in this State should constantly employ one physician as a health officer, there would still remain 2,240 doctors to attend to the sickness which the other third failed to prevent; and the 1,261 physicians who would then be constantly employed as health officers of local boards of health would cost for permanent salaries only a small part of the $3,500,000, which is now estimated to be paid to physicians.

The main reason why we need an active health officer, who understands his business, in every city, village, and township, is that the people do not now seem to know the preventable nature of the diseases which kill them. In many places they stand by like dumb animals and suffer their children to die of diphtheria and other communicable diseases, and never lift a finger to try to prevent the spread of these diseases. This apathy and ignorant or wilful disregard for human life is not confined to the rural districts, but is seen in some cities.

PRACTICAL ILLUSTRATIONS.

In Detroit the burials in the city cemeteries indicate that the deaths number about 2,000 in each year. Of this number, the deaths from diseases usually included among those which endanger the public health, and which therefore are both by the law and by sanitarians regarded as preventable, usually number about 240, which is twelve per cent of the total deaths reported. And this does not include consumption, pneumonia, or diarrhea, many deaths from which diseases I believe could be prevented. If we conclude that under good effective sanitary work the sickness could be reduced by ten per cent, the 200 physicians in Detroit, of whom we have the names, might safely be reduced by that proportion; and if the 20 doctors thus thrown out of employment were employed by the city in the work of general and special sanitation, I firmly believe that it would be in the direction of true economy for the citizens of Detroit. And when I plead for sanitary work, it is not for such work as may be done by a number of city physicians whose duties are, first, to attend to their own private practice; second, to attend to the sick poor within their jurisdiction. This is not general sanitation nor work for the prevention of sickness; it is not even preventive medicine; it is the same old idea of trying to cure what should have been prevented; it is like locking the stable-door after the horse is stolen, and is frequently a waste of time and money, because the communicable diseases are generally, as yet, self-limited diseases which run their course under any treatment, though such care as a skillful physician may prescribe may sometimes save life.

The following letter may be put in evidence as to what is really done in Detroit:

> CITY OF DETROIT, CLERK'S OFFICE,
> *February 2, 1880.*
>
> *Secretary of State Board of Health:*
>
> DEAR SIR:—Forms for making reports of Board of Health to your office received. The Board of Health of Detroit have not met during the past year, so I am unable to give the information requested. It is probable that they will hold no more meetings.
>
> Yours respectfully,
>
> HARRY S. STARKEY,
> *Asst. City Clerk.*

A subsequent letter from the same gentleman stated that there was no clerk of a board of health, no board of health, and no health officer.

The Board of Health in the city of Detroit has not met during the past year! And yet we know there have been hundreds of cases of sickness and many deaths in that city from causes believed to be preventable. We see accounts of frequent meetings of the different medical societies of Detroit, and of their flourishing condition. There are excellent physicians in Detroit, and good hospitals; there are medical colleges, and, as I am told, there is plenty of material for clinical illustrations of all sorts of diseases; but the board of health has "not met during the past year"! We have, as I have stated, the names of about 200 physicians in Detroit. I presume there are more than that number. Let us suppose that the two hundred physicians have an average annual income, from their practice, of only one thousand dollars each,—then the citizens of Detroit pay two hundred thousand dollars a year to those who prescribe for cases of sickness. And yet we are officially informed that the board of health in that city has "not met during the past year." I suppose its motto on this subject may fairly be stated: *two hundred thousand dollars for the cure of disease, but not one thousand for its prevention.* Under such circumstances, I do not wonder that the city is ashamed to publish a report of deaths and causes of deaths, and that we find it impossible to get such official statistics from Detroit, though we have no difficulty in securing such reports of the mortality in many of the principal cities in this, and in other countries.

The health officer of Bay City is not a physician, as the law requires where this is practicable. He says the physicians do not report to him, and that he is entirely unable to make the reports to the State Board which are required under the law. He says there are in Bay City about forty physicians, that their annual incomes will average at least $2,000 each; that is, the people of Bay City pay $80,000 a year to physicians. Suppose ten per cent of those physicians were employed and paid by the city, to labor for the prevention of disease, and held morally responsible for the occurrence of preventable diseases. Then four physicians would be thus constantly employed, and paid $2,000 each per year, thus diverting $8,000 out of the $80,000. Does anyone doubt that this sum would be saved from the $80,000 now necessary to be expended in paying physicians for the cure of sickness? Possibly it might not decrease the sickness ten per cent the first year, but I firmly believe that if continued it would be a paying investment in the end, for the physicians so employed would gradually become sanitarians; and in order for this to be a paying investment the first year, it is not necessary that the sickness be reduced by 10 per cent, because the doctor's fee is frequently only a small part of the expense of sickness.

I suppose most of those present know the facts as regards this city of Grand Rapids, of which I am not to speak at this time.

Coming nearer to Grand Rapids, however, than Detroit or Bay City, the following letter states the condition of things in Grand Haven:

RECORDER'S OFFICE, CITY OF GRAND HAVEN,
February 2, 1880.

Henry B. Baker, Esq., Secretary State Board of Health, Lansing, Mich.:

DEAR SIR:—It will be utterly impossible for me to send you anything in the shape of an official report, for the reason that our board of health have utterly ignored the laws of the State relating to sanitary matters; we have had a great number of cases of diphtheria, scarlet fever, and measles in our city during the year 1879, but not reported to the board of health as far as I know.

Very respectfully,
THOS. F. HOWE,
City Recorder.

In Detroit, in Bay City, in Grand Haven, and perhaps in other cities in Michigan, it seems to be considered too expensive to have a health officer and pay him, as should be done, two thousand dollars a year, and require his entire energies to be put forth for the prevention of sickness and deaths. I suppose that one reason for this state of things is that to have a health officer requires some action on the part of city officials, and perhaps a vote to pay him his salary, while it is possible, for instance in the city of Detroit, to permit the people of the city to pay $200,000 a year for physicians without any official action whatever.

We understand very well that there are taxes which come by assessments because of official action,—it may be well for us to understand that there are also heavy expenses which may sometimes come upon us without official assessment, and even because of neglect to provide for assessments to prevent such heavy expenses.

The expense for physicians is only a small part of the cost and losses because of sickness. In my plea for better methods, I refer to the expense for physicians only, for purposes of illustration, because it is for personal services somewhat analagous to those which would be given by a health officer, and because the facts are easily obtained, and their bearing easily understood. I do not see how a rational person can examine the facts, and not be convinced that at least one skilled physician and sanitarian should be constantly employed as a health officer in every city and village in the State, and from time to time in every township.

"KNOWLEDGE IS POWER."

Never yet has the public health service of Detroit, Bay City, Adrian, Jackson, or indeed of any city in Michigan been properly organized for effective and complete work in all branches of the service. The vital statistics of the city, which lie at the very foundation of effective public health service, have never been properly collected. No tables carefully compiled under the immediate supervision of a medical man or vital statistician are regularly published by any city in Michigan. Without such means of knowledge respecting the particular sources of danger to life in Detroit or in any city, it is not probable that the city will ever have the most effective sanitary work. Knowledge is power, in sanitary work as in other pursuits; and the most effective public health service is based upon accurate knowledge of the sources of danger to life and health within the jurisdiction of that service. Complete statistics of deaths, where obtained, supply the knowledge of relative danger to life from each recognized cause of death; and such statistics properly studied in connection with other facts also lead to a knowledge of many causes of death not previously known, and which cannot otherwise be ascertained.

WHAT IS NEEDED FOR SUCCESSFUL GENERAL SANITATION.

It is only by *organized* effort that the best success is attained; what is needed in this city and in every city is that the comparatively few who really appreciate the very great importance of this work shall strongly coöperate and be active and energetic in intelligent efforts for the proper organization and work of the public health service. It is a subject which deals with questions upon which our very lives depend, and is so far above all the usual questions of party politics that all good people should unite to select and retain the very best men it is possible to secure, and to see to it that such men shall be supplied with the money and support necessary to properly maintain an effective public health service. We should remember that the most severe tax to pay is the "debt of nature", and next to that the heavy tax which sickness always entails, and in one way or another forces the collection of. These considerations are too often lost sight of by "penny wise and pound foolish" city authorities who grudgingly dole out a few dollars, and sometimes fail to do even that, for the use of the city board of health, the most important organization in the city, and one on whose proper action depends the health, life, and happiness of the people who pay the taxes; for although the sickness from preventable causes is usually most severe among the poor and ignorant, communicable diseases are no respecters of persons, and the poorest resident of a back alley may be able to give to the richest citizen the most loathsome, fatal, or rapidly-spreading disease. As "the strength of a chain is the strength of its weakest link", so the health and strength of the people of a community may depend upon the health and strength of the weakest members. In these times of rapid communication among people throughout the world, and close relations of members of communities, no man can live for himself alone; but whether he knows it or not, he has a vital interest in the health and prosperity of his fellow beings.

MISSIONARY SANITARY WORK.

After the student in sanitary science has mastered so much of the physical, medical, social, and other sciences as to enable him to be of real use to humanity in his particular sphere, his usefulness will then be somewhat in proportion to his ability to impart the results of his research, experience, observation, and study. Therefore one of the most important parts of the work of the leading sanitarian is now, and it seems to me must always be, somewhat akin to the missionary work done by the clergy. The leading sanitarian must first labor until he is convinced that he has gained at least a part of Nature's eternal truth, and he must then rouse people to an appreciation of the direful consequences of their own transgressions; he must point out the better way of life, while he denounces most of the old ways as sinful, degrading, and leading down to death and destruction. Stated in this way, it really seems plain that the work is a noble one, because intended to advance the best interests of mankind,—to promote health and happiness among the people. Perhaps it is for this reason that the sanitarian is so often forced to carry his cross; because we have still with us many people who can persecute the apostles of science in ways which cause pain if not death. People do not seem to like to have their transgression of sanitary laws pointed out to them. This brings me to consider some hindrances to sanitary progress.

HINDRANCES.

In connection with sanitary progress, one phenomenon so generally appears that it is worthy of mention, because it constantly interferes with our facilities for arriving at the truth, and because it interferes with efforts for improvement in almost every line of work. I refer to the opposition which is almost uniformly met when any necessity for improvement is pointed out,—the opposition coming from those most closely related to the nuisance or cause of sickness. This may, at first thought, appear improbable; but I think you will find it true, as a general rule.

If a neighbor or the health authority complains of a nuisance on a man's premises, the owner insists that it is no more a nuisance than is common all about him, and that to complain of it is a mean personal attack upon himself. He resents it as an insult. If, after a careful search for the causes of an outbreak of typhoid fever, you trace all the cases of the disease to exposure to unsanitary conditions at a certain house, or to drinking water from a certain well, the owner of the house or well almost always endeavors to maintain that his house or his well is in good sanitary condition, and that it is absurd to believe that you have found the cause of the sickness in anything connected with *his* premises.

If after careful investigation it is found that there are sanitary defects incident to certain methods of constructing, heating, lighting, or ventilating school-buildings, or to certain methods of study or teaching in our schools, I think that as a rule those who are most closely connected with the schools, and particularly those who feel a certain degree of responsibility for the best possible conditions in our schools, are rather slow to acknowledge any such defects as those pointed out.

This general principle of opposition to change is found in individuals, in systems,—such, for instance, as the public school system,—and in institutions,—such as our State institutions, some of which have been inspected by members of the State Board of Health, sometimes by invitation, but usually to the discomfort of the managers of such institutions, and their opposition to the conclusions of the inspecting officer. Our human nature seems to be opposed to sanitary reforms if prescribed for ourselves by others; we are usually more willing to believe that *other* people should reform.

NOT THIS CITY, BUT THE RIVAL CITY.

The principle of opposition is particularly noticeable respecting cities. Probably many persons in this city would promptly resent it if I were to say that your city is wofully negligent of the best interests of humanity within its limits, that those sacred interests of life, health, and happiness which are entrusted to a local board of health receive little or no attention, while other political interests of much less consequence absorb all the taxes you pay and the entire time and efforts which your city officials use in your interests. Because of this uniform dislike of homely truths which apply to ourselves, I shall not tell you that this is true, but will only say that I *know* of a city in this State, similar to this in some respects, and which we will call "the rival city", in which the people themselves pay very little attention to sanitary subjects, they give such subjects no serious thought, and the officers whom the people elect fairly represent the people who elect them, and *they* pay no attention to such subjects, and give them no earnest thought. They do not seem to care whether or not they comply with the State law which requires that the city shall have a health officer, and if they ever appoint one his compensation is insufficient, and he is not required to devote all his energies to his official duties; no thorough attempt is made to collect statistics of deaths, and thus add to the common stock of useful knowledge of the causes of diseases and deaths, and of the best means of avoiding such causes; there is no systematic house-to-house inspection for nuisances, and no prompt action for the abatement of every nuisance; when an epidemic comes it finds the city unprepared, and the cleaning-up process is commenced when it is too late to do anything but harm; cases of typhoid fever occasionally occur, but no sanitary officer searches diligently until he finds and removes the source of the disease; and other people are left in ignorance, to go on and contract the disease if they chance to come under the same dangerous conditions, which to them are unknown and therefore unavoidable; a case of small-pox occurs, and to avoid a panic or loss of custom to a few merchants and others, the truth is suppressed, the people are not warned that they must be vaccinated, and an epidemic of small-pox occasionally results. Scarlet fever breaks out, but no active board of health has educated the people in the requirements of the law for prompt notice of such diseases, and it is a long time before the board of health receives such "official" information of the outbreak as to be stirred to action; meanwhile many families have buried their loved ones,—dead of that disease so dreadful to parents. Diphtheria finally comes. It had prevailed in neighboring places for a long time, but the members of the board of health have not investigated the subject,—some of them do not know that it is a communicable disease, and exceedingly dangerous to the public health, though they know that the deaths occur mostly among the children. Many of the doctors call mild cases by other names. Nothing is done to stop its spread, and very soon there are so many sources that it is impossible to trace the spread of the disease by contagion, and the city has one more disease fastened upon it, perhaps for all time to come, though the disease may occasionally die down for lack of material, only to spring up again on the opening of the schools in Autumn, after more children shall have grown up to the most susceptible age.

But this is getting to be a dismal tale. What croaker dares stand up and say that the rival city here described is in any respect similar to this fair city? Fortunately for our temporary ease of mind, but, perhaps, unfortunately for our rapid progress and permanent safety and happiness, no such gloomy talk as this is ever permitted in polite society, and I gladly turn from it.

MONEY VALUES OF IMPROVED SANITARY METHODS.

Mr. Jackson S. Schultz, of New York, has lately said that "from 1822 to 1840, during the Summer months, no business could be done in hides and rags," because of the nature of the quarantine, which however was the best known at that time; that "the loss to those engaged in commerce and manufactures requiring those articles, must have been at least $100,000,000,—a sum sufficient to sustain all the health boards in the country." *Now* the quarantine is so managed by experts as to occasion little interruption to commerce or manufactures. He said: "If these trades should be again stopped, it would pay them to establish schools and hospitals for the education of doctors for some time to come." Perhaps he meant the education of sanitarians or health officers. He is not a physician, but said he spoke "from the point of view of the tradesman." His statements show that *after sanitary progress has been made*, its importance is recognized by some classes of people. It is to be hoped that the time will soon come when all classes of people can realize the importance of *aiding its progress*.

If an improved quarantine system in New York is worth $100,000,000 in eighteen years simply to the business connected with hides and rags, then certainly better methods of sanitation which are applicable to all kinds of business interests throughout our State must be of very considerable importance to the people of this State. Because whenever a prominent communicable disease, such as diphtheria, yellow fever, or scarlet fever, breaks out in a place, business interests are certain to suffer; and in spite of, and perhaps because of attempts to suppress the knowledge of the outbreak of a communicable disease, the disease frequently spreads and finally injures the business of a place far more than it would have done had the first case been promptly reported to a board of health whose known efficiency would be a guarantee that the disease would be at once suppressed.

RELATION OF SCHOOLS TO PUBLIC SANITATION.

Business interests in relation to this subject are great, but educational interests are probably greater, at least to the rising generation which is soon to displace us. Under present imperfect methods there seems to be no escape from one of two evils,—either the schools continue and spread scarlet fever, diphtheria, and other communicable diseases throughout cities and throughout the State, as they are now spreading diphtheria; or the schools are closed, and though the public health, which is of the greatest consequence, is furthered thereby, the whole educational work is for the time broken up. What is worse, this breaking-up process must come still more frequently as time goes on, unless some improved methods are adopted; because modes of inter-communication are becoming more complex. Under present methods the schools are not closed promptly on the outbreak of a communicable disease, but only after the disease is quite general, and as the germs of these diseases remain active for quite a long time, whenever the schools open, at least in the Autumn, there is likely to be some pupil prepared to communicate one or more of the infectious diseases.

For the best interests of the schools and for public health, we need an entirely different sort of work from what we now have,—a much more thorough, systematic, continuous, and rational support of our present laws, which seem to be a long way in advance of the knowledge or practice of the people. Suppose that, instead of suffering as we now do, a very considerable proportion of the children sent to school to die or suffer through life from the results of diseases contracted in school, or instead of breaking up the schools every year or so, and losing the entire benefits of the school for a considerable time, we were to employ constantly a few experts to do away with both these evils. To me this seems just as practicable as was the improved quarantine in New York City, if only our people will unite in the work. I suppose that the quarantine system of New York City now costs about $100,000 a year; and we have seen that a tradesman estimates the annual saving to only a few trades to be millions of dollars.

HOW CAN THE SCHOOLS GO ON WITHOUT DISSEMINATING DISEASE?

Let us consider some of the work which needs to be done in order that the schools may go on continuously and yet not spread disease.

The three most important general principles of action by the improved New York quarantine are: Isolation of the sick, disinfection of all infected material, and ventilation of everything. In order that this shall be possible in relation to the schools of a city, it is essential to have such a thorough organization of the health authority of a city as that suspected cases of communicable disease shall be promptly reported to the board of health and be immediately visited, and the truth learned whether or not the case is one involving danger to the community. The health authority must be given money sufficient to have such work done with as much promptness as the fire department displays in visiting the locality of a reported fire; and as the firemen remain until the fire is out, so the health department might have it officer or employé remain until the disease is over, he should watch and guard the public safety. He ought to use disinfectants skillfully, and, if need be, as freely as water, until all danger of a fresh outbreak should be prevented. He should see to it that in no way does the disease spread. Now, we quarantine all, sick and well, by closing the schools. An active health department should at all times have as perfect knowledge of the location of cases of diseases which endanger the *people* under its protection, as the fire department does of the buildings which are burning and thus endangering the *property* under its protection. With such knowledge as this the health department could furnish the teacher of every school in the city with a list of all families in which there was a person sick with a communicable disease, and if necessary an agent of the health department, or some other person, could act as sentry at each school, and persons liable to communicate disease could be kept out. As an additional precaution even where there has been no known infection, all articles likely to convey disease into the school could be easily disinfected, if it were only a custom to do so and provision were made for such disinfection. It would be easy to have a small room at every school-house where the outer wearing-apparel etc., could be disinfected and aired while the wearer was in school, instead of having, as is now so commonly the case, the clothing of all closely packed in an unventilated closet.

GENERAL BOARDS OF HEALTH.

Some one may question why, in this paper on general sanitation, so little is said about general boards of health,—State and National. It is not because such boards are not of exceedingly great importance; for in my opinion, they are essential to successful general sanitary work; but because they are further removed from the people for whom this paper is intended, and because of the truly democratic character of the health laws of this State, their theory and underlying principle being that:—

LOCAL NUISANCES SHOULD BE DEALT WITH BY LOCAL AUTHORITIES.

This principle seems to me to be so manifestly sound, that it is unnecessary to dwell upon it; but inasmuch as it is so frequently overlooked, it seems necessary to mention it briefly. The laws of this State give to local boards of health almost absolute power over everything relating to the restriction and prevention of diseases, the abatement of nuisances, etc., and no such powers are given to the State Board of Health, which has duties no less important, but of a different character. It will thus be seen that *local boards of health are justly responsible for preventable sickness within their jurisdiction.*

ESSENTIALS FOR PROGRESS IN PUBLIC HEALTH AND PROSPERITY.

As the local boards of health which have this absolute power and consequent responsibility are composed of just the men whom the people of each locality choose to have act as the guardians of their lives and health, it seems evident that no progress can be made except the people themselves shall in some way make progress in sanitary knowledge; and as it would be very much like requiring a man to raise himself by his boot-straps to expect that the greatest progress can be made without some outside aid, the laws of this State make provision for the utilization of the best work and experience of each and every local board for the benefit of all the other boards, through a system of annual and special reports to the State Board of Health, which is charged with the duty of collecting and disseminating all kinds of useful information on the causation, prevention, and restriction of diseases and deaths.

It may thus be seen that though the State Board collects useful information from all possible sources, it is more or less dependent upon local boards for material to compile, collate, and utilize for the general good; and its work in diffusing information, and in other directions is advanced by whatever advances the general activity and usefulness of the local boards. We have seen that the local boards are what the people make them. So that what is most essential to progress in public health, and consequent prosperity, is general progress in sanitary knowledge among the people. To those good people in Detroit and Grand Rapids who, with this object in view, have made these Sanitary Conventions possible and successful, are due our thanks and the thanks of all citizens.

DISCUSSION.

At the close of Dr. Baker's paper general discussion followed. Rev. Dr. D. C. Jacokes, of Pontiac, one of the members of the State Board of Health, suggested that there was a remarkable lack of information among the people on sanitary subjects and science. But such conventions as this would educate the people--he had already seen practical benefits flowing from the first State sanitary convention which was held in Detroit in January. He hoped that the useful papers promulgated and distributed by our own and other State or national boards of health or sanitary conventions, would be generally printed and distributed among the people.

The Rev. J. Morgan Smith followed in brief remarks in which he fully endorsed the statements in Dr. Baker's paper and commended them to public attention. What the people want, and need, is education on these matters; they do not understand them, and with an American's apparently inherent opposition to law, they do not obey the plain rules and regulations in health imposed by the State legislature and boards of health on the people for their own good. They must be told why these rules are good; there must be an educated public sentiment approving these laws, ready to better them if possible, and then they will be enforced and will prove beneficial. In his opinion, filthiness is the great bane or evil of mankind--the Bible seems to so recognize it, and he hoped the time would soon come when all the people would be clean.

Dr. Kedzie agreed that the people need education in this matter, and commended the example of the village of Tecumseh, where the citizens have made arrangements for articles from half a column to a column long on sanitary topics, to be published weekly in the village paper. These will be furnished by the educated, prominent citizens of the village and will be practical in nature. This example should be emulated.

Mr. Jno. K. Allen, of Lansing, clerk in the office of the State Board of Health, called attention to the list of books, circulars, etc., on exhibition in the room, ready for free distribution, furnished by the State Board of Health to such as are interested in sanitary matters. It contained the Reports of the State Board of Health for 1877 and 1878, the Registration Report of Vital Statistics for 1873; circulars, on the restriction and prevention of diphtheria, and of scarlet fever, the treatment of drowned and suffocated persons, relative to notices of diseases which endanger public health, duties of householders, physicians, and others, the work of health officers and of local boards of health, and a lecture on Healthy Homes for Farmers, by Dr. R. C. Kedzie. Mr.

Allen also called attention to the collection of sanitary tracts exhibited by himself, some seventy-five in number, published by the Ladies' Sanitary Association of London, England, and the Italian Health Society of Milan—the latter in Italian. These tracts were published for gratuitous distribution among the poor, and were written in a popular style. The tracts of the London Association could be procured in a bound volume for 10s. 6d. sterling, by writing to the Secretary, Miss Rose Adams, 22 Berners st., Oxford st. West, London. He said these tracts were published for gratuitous distribution by the members of the Ladies' Association in London, and urged the formation of similar societies in our own city and State.

Dr. J. B. Griswold, former city physician and *ex officio* health officer of the city, gave his experiences in that capacity. He said that the board was not able to accomplish any practical work, because whenever the local board of health attempted, the city attorney informed it that it had no legal power to compel observance of its rules or orders. He wanted to know if such boards of health had power or not. He said that the board had no money at its command to expend for health purposes, and called attention to the fact that the council had questioned the necessity of paying a bill of $15 for work ordered by the board of health, after the controller had passed it, and perhaps would not pay it all, as a specimen of the rule in vogue here. He also called attention to the fact that no accurate reports of deaths and causes are made from this city, but showed the necessity for them, and for just such knowledge as Dr. Baker had given, by saying that the reports of sextons of the city cemeteries show about 130 deaths here from diphtheria alone the past year. The fact was a terrible commentary on the negligence, ignorance, and niggardliness of our people in sanitary matters.

Dr. Baker said the State Board of Health furnished circulars showing what are the legal powers of local boards of health, and that such a circular was in the collection present for distribution.

Mr. Henry Grinnell, in a short talk, conveyed the same idea as Dr. Griswold, and asked to be made right on the subject.

Dr. Brigham thought it was bordering on criminality to allow people to die for want of information on matters of vital interest.

Rev. J. Morgan Smith offered a resolution which was supported and adopted to the effect that they, as citizens of Grand Rapids, heartily welcome the Board to the city, and pledge themselves to further the good cause with all their might.

Bishop Gillespie referred to the law relative to the inspection of public buildings, and asked if it had been observed in this city.

Mr. S. D. Clay declared that when their patients die of diphtheria, physicians never report the cases; when they get well, they invariably report them.

The meeting then adjourned to meet at 10 o'clock A. M. Wednesday.

SECOND SESSION, WEDNESDAY MORNING, FEB. 18, 1880.

The morning session began at 10 o'clock, with Bishop Gillespie in the chair. The Rev. A. A. Knappen of the Division St. M. E. Church, opened the convention with prayer. Dr. Hazlewood, the Secretary of the Convention, being absent for a time on professional duties, the reading of the minutes of last night's session was dispensed with, and Mr. Jno. K. Allen, of Lansing, was chosen Secretary *pro tem.*

The first paper was read by the Rev. J. Morgan Smith, on "The Duties of the Christian in Respect to the Laws of Health."

THE DUTY OF THE CHRISTIAN IN RESPECT TO THE LAWS OF HEALTH.

BY REV. J. MORGAN SMITH, OF GRAND RAPIDS.

The christian, strictly speaking, is a person who is bound by his conscience to sustain those duties which are prescribed for him in the Bible. Concerning the laws of bodily health the directions of the Scriptures are plain and few.

1. The body is viewed as belonging to God and the temple of the Holy Spirit. We are told to serve God with our bodies, which are also his. They should therefore be kept from moral impurity, as degrading to so sacred a piece of property. Things necessary for the body are to be provided. That minute and attentive culture of the body which was practiced by the Greeks and Romans almost to perfection, is hardly alluded to in the New Testament. All bodily fitness is regarded in its reference to the soul! Nothing is said in praise of physical *beauty*.

2. Looking at the example of the Savior himself, we find him engaged till

his death in relieving bodily infirmity and disease. But he joined this work with his purpose to promote the redemption of the soul. He healed the complaints of the flesh, that he might the more readily remove the deeper maladies of the mind. We cannot but infer that he knew how much a purified and believing heart depends upon the body which it inhabits.

3. The Old Testament is more direct upon this subject. Health and long life are motives appealed to by its writers for obeying the commandments of God. Fairness of person is spoken of with admiration, as when Moses is spoken of as a beautiful child. Most of the ceremonials of the Mosaic law rigidly inculcate that cleanliness which John Wesley taught is next to Godliness.

4. We must certainly conclude from the Bible, that the necessary laws of health are duties to be observed by any one who regards the authority of the Scriptures. For they, by holding the body in subordination to the soul demand that it shall not hinder the soul by its defects. Sleep, air, exercise, cleanliness, appropriate food and careful appropriation of food are necessities of the body. They are therefore duties. They promote and lengthen that life which christian faith and principle use for holier ends. To disregard these necessities is consequently a wrong, and *worse* than a wrong because an offense inflicted on that which is of more value than the body itself.

It is true that under bodily infirmities, christian virtue often rises into beauty of patience and trust. Victory over bodily suffering and death is a triumph of the christian. But power exhibited in *spite* of the evil of pain is no argument against power produced without pain. The skill of the physician is sharpened into acuteness in the presence of disease. But that is no reason why it should not just as much or more be trained in the *prevention* of disease. The good which comes from a suffering life is purchased at a great expense. The benefits of a wholesome life are just as great and *avoid* that expense. Failure anywhere in the world contains lessons valuable in experience. But it would be doing evil that good may come to encourage failure that the lesson may be obtained. That sentiment in religion which favors a weakly body as fitting to the christian type of living, is sickly. It finds a merit, in a morbid condition which only *produces* merit by *resistance* to it. We are asking what is the normal duty of the christian. It is to obey known and necessary laws of health as divine commands. What he shall do when he has lost his power to keep them, is another question.

5. But we are called upon to-day to take a larger position for the christian than that of his duty to old, well-known, and established necessities of health. What is his duty to sanitary science? What ought christians as a body to do, if the positions of that science are proven? Shall the churches include them in their moral standards? Shall it be a matter of conscience to sustain them and inconsistent for a church-member to disregard them?

I hope to express some good sense in reply to such questions.

a. We are speaking of that which is or is not *duty*, to disobey which is a wrong—and so an immorality. It is not sufficient to say that sanitary science is in accordance with enlightened christian sentiment. There is much unenlightened sentiment to be instructed. Nor may we stop with showing how desirable it is to press sanitary knowledge upon the people. For that which is desirable is not always a duty. The instincts of mercy are powerful. The fear of pain, disease, and death is very great. They naturally *command* attention to sanitary truth. But how far that attention is a christian duty is not yet determined by the conscience, and certainly not yet by any declared doctrine. Is it our duty as christians to do more than we have done? As citizens, too, under a *sanitary government*, it is our duty to heed its recommendations. In city and state a sanitary police is as binding as any police, to those who respect the laws. But suppose there were no such laws or police! Would it be the duty of christians as such, to proclaim and follow them?

b. I am therefore seeking a definite christian ground for larger action on this subject than is usually affirmed.

It seems to me that we must make our proof on a broader position than that of a specific law in the Bible ordering us to regard all facts of physical health. Start with the principles, "Thou shalt love thy neighbor as thyself", "Love worketh *no* ill to his neighbor", "Do unto others as ye would that others should do unto you", "Jesus went about doing good". They will inevitably carry us to that position where as christians we only require to have our duty plainly shown, and we shall acknowledge it.

c. No one would be satisfied to be poisoned by his neighbors' drain, or to be infected with his neighbors' contagion, or to drink from his neighbors' cesspool, could he prevent it. No community, city, or state would allow an invasion of yellow fever or small-pox, could it institute quarantine to bar out either. Neglects of sanitary precautions, and stupidity towards sanitary information spring to a great extent from a selfish willingness to let others suffer provided we suppose *ourselves* in a fair way to escape. Did we hold the solid christian ground of *protecting* our neighbors as justly and fully as we protect ourselves, did we make our laws of self-preservation as wide as christian principle requires, and take in the preservation of others, we are at once on a basis of duty, where established sanitary knowledge is as christian in its character as the knowledge that *theft* injures those whom we ought not to injure.

We are prepared then to take the ground that established sanitary knowledge involves a general christian duty under the command of christian justice,—to do by others as we would they should do by us; and the spirit of christian love which worketh no ill to its neighbor. Just as the demand for freedom for *one* extends ultimately to freedom for all; just as our requirement of honesty towards ourselves results in our duty of honesty to every one, so our necessity for bodily self-preservation is only completed, in the christian light, by granting aid to such security for the masses.

6. It remains that I should express an opinion as to the *extent* to which christian action ought to go in obedience to sanitary law.

a. Of course all means of communicating knowledge upon this subject are *christian in their use*. The publication of judicious tracts, the dissemination of sanitary rules through the schools to every family, and the holding of popular conventions must precede intelligent action on the part of the people. Sanitary laws and boards of health, armed with police power, are but the ordinary weapons of offense in the holy war against dirt and poison. Truth on this subject percolates slowly. While in England the first of her statesmen (Disraeli) introduces a sanitary policy into his measures, you could not at present persuade any political party here to put a sanitary *plank* into its platform. We have laws against intemperance, and against the traditional contagion of small-pox and yellow fever; yet how many more lives are annually destroyed by diphtheria and typhoid fever than by liquor? It is evident that the people are not generally awake to the connection between cause and effect, difficulty and remedy, in the case of the latter diseases as they justly are in the case of the former. Sanitary agitation in no respects equals as yet temperance agitation. Yet the same christian principle of preventing harm to our neighbor applies to both causes. We ought then to *encourage* sanitary *sentiment.* It is a duty of the christian pulpit to instruct upon it. The people should inform themselves about it. They should be supplied with all correct information in abundance, and as incorrect information leads to very expensive and useless experiments it seems to me vital in this business that the people should be able to secure properly authorized information. In the rapid increase of our cities, and in the changes from temporary to permanent structures among a dense population, an enormous cost is required to *sanitarize* our streets and abodes thoroughly. If done only by *private impulse,* it can only be undertaken by the wealthy. It will only be partially done. We need some *uniform, sure,* and cheap *means* of drainage, cleanliness, and disinfection. This cannot be secured while opinions and inventions conflict as they do. "We must have drainage by sewers," say some. But "sewers are channels of poison", say others. Who is to decide and direct unless the *general authority* acts?

The people have a cause here. But the *vis inertiæ* of custom delays them. There yet remains much ignorance. "We have all heard of the power of knowledge," says George Eliot, "but who has ever yet measured the power of ignorance?"

I say, then, with regard to the *extent* of christian duty in relation to sanitary law, that at present we can hardly go too far in pressing the truth.

b. I conclude with two or three *facts* which show what *might* be done, were sanitary measures, under the impulse of christian sentiment and duty, to be pressed to their due extent among and by the people. They also exhibit the value of a State Board of Health in point of economy.

The city of Meriden, Connecticut, made estimates lately for a system of drainage for twenty-five thousand people. The sum total of cost was $550,000. The State Board of Health submitted a better plan for the sum of $154,772—a saving of nearly $400,000.

A gentleman by the name of Chadwick, formerly chief officer of the first English board of health, makes the following sanitary figures: There are in England annually, 120,000 preventable deaths, and 1,200,000 cases of preventable serious sickness. The neglect of sanitary law costs England annually a direct loss of $96,000,000, while the interest on the British debt is only $84,000,000.

Mr. Chadwick found that in certain parts of single cities, properly drained, in 1,000 persons there were 60 of 40 years, while in other parts there were only 40 persons of that age. That is to say, sanitary precautions would practically add *one-third* to the population of a place.

Mr. Chadwick also says that the healthiest place he could find in England was a jail, where the death-rate is less than one in a *thousand.* Because he says in jails regular personal ablution and avoidance of *spirits, beer, tea, and tobacco* are rigidly practiced.

One other fact, which a State Board of Health might consider, which touches christian sympathies more deeply than all. In the fourteen years preceding 1876, 39,927 people were burned to death in England, and "nearly all of these deaths were unnecessary." In this number, far larger than any inquisition ever consumed in the same time, there were 10,547 children under five years of age, or an average of 1,500 per year. I wish my audience would connect this fact with the kerosene-burnings, which used to shock us in Michigan, and the howl that was raised against a stringent law to test burning-fluids!

Friends, such facts stir in us the indignation of that deep law of humanity which is one of the laws of Christ. They remind us that the judgment of that law is not only against us when we act cruelly, but also when we neglect to save that which we might save.

The second paper was read by City Surveyor A. C. Sekell, on the Sewerage of the City of Grand Rapids.

SEWERAGE OF THE CITY OF GRAND RAPIDS.

BY A. C. SEKELL, OF GRAND RAPIDS.

Mr. President, Ladies and Gentlemen:—I have been invited by your Secretary to prepare a sketch of the condition of the sewerage-system of our city of Grand Rapids, and I have consented to do so, not with the expectation of satisfactorily performing the work, but in the hope of being able to contribute in some slight degree to the labors of this convention, and to aid if possible the efforts of those who with praiseworthy endeavors seek to discover and teach those unchanging laws of nature, the violation of which brings so much of suffering and death to the human family.

An understanding of the causes leading to sewer-construction, and a knowledge of the practical difficulties which are encountered in the constructive work, will enable us to account in a great degree for that unsatisfactory condition of affairs which is so often found in sewer-systems already built and in operation, and which obtains in some degree in our own city.

The necessity for sewerage arises from three separate and distinct causes:

a. From the fact that in all communities it is of vital importance that the fluid and feculent refuse of dwellings, the sewage, be disposed of or removed.

b. That in certain cases the thorough drainage of the subsoil, the removal of the ground-water is of paramount importance to the health of the district, and,—

c. From the necessity of providing means of escape for the surface-water of storms.

I do not wish to be understood as placing these causes in the relative order of their importance, and I would also say that the above statement is intended to apply more particularly to our own city rather than to be a statement of universal application; for it will readily be seen that a community may be established in a locality needing no sub-drainage, such as large portions of the more elevated sections of our city, or upon a site from which the storm-water might be readily discharged into natural water-courses by means of open gutters.

During the past year sewers have been constructed in our city where each one of the three causes named has alone been the prime mover leading to their construction; in some cases two of the causes stated have operated, and in others all three.

When you recollect that all our sewers, no matter what may have been the cause or causes leading to their construction, are in all cases built in such a way as to render them capable of being used for each and all of the three purposes which I have indicated, namely, the draining of buildings, the draining of the soil where necessary, and the carriage of the surface-water of storms, and when it is further remembered that each of these functions, when considered by itself, can best be discharged by methods different from what should be adopted for the others, you will not wonder that sewers sometimes appear to be not all that could be desired when considered from the standpoint of the sanitarian.

That great good follows the construction of sewers is true, but it is equally true that in some respects our modern systems of sewerage are sources of evil, and to these our attention may well be directed. Complete systems of sewerage are of modern construction, no city of antiquity having been drained with the completeness which characterizes so many of our existing cities, and being modern we have no reason to suppose that we have reached the limit of improvement, and that the difficulties now encountered may not be overcome.

Sewerage construction as practiced to meet the purposes named, provides, first that the ground or subsoil water may enter through the porous walls or open joints of the sewer; second, that the storm-water may enter from the surface through suitable conductors, the sewer being often of great size to accommodate such exceptional storms as may happen once in several years; and third, that the sewage from buildings may be carried to the point of discharge.

From this practice arise under certain conditions the unavoidable evils of imperfect ventilation and sewer-gas; and if to these we add the additional evils which flow from bad work, and bad materials, such as may often be found in those parts of our system first constructed, we have no cause to be surprised that unsatisfactory results follow.

The evils that flow from the legitimate practice of such sewer-construction as I have indicated, as being adapted to a three-fold use, may be briefly described; and by the term legitimate I mean honest practice where the work and materials are of the desired quality and kind, and the work properly planned and laid out.

An open joint or porous wall may permit the escape of the sewage, which may render the soil in the vicinity unwholesome, polluting the ground air and poisoning the ground water.

In this connection I mention a practical difficulty which stands in the way of making sewers so tight that the sewage will not leak out. Where there is no subsoil water to be encountered, it is easy to make the sewer tight or nearly so; but when the sewer is passing below the level of the water table the constant tendency of the water to enter the drain is so great that water-tight construction is next to impossible; that is, water-tight construction in the lower part of the sewer below the flow line of the sewage which will eventually be carried. Those of you who have tried the experiment of keeping water out of wet cellars by cementing the inside, will understand the difficulty. Whether the portions of the sewer constructed through the wet ground leak or not I suppose depends on whether the surface of the water flowing in the sewer after completion is above or below the surface of the water in the earth outside of the sewer.

From the necessity of providing for the flow of the surface-water of storms, comes the large sizes which we adopt for our main sewers; and here we have, it seems to me, one of the chief causes leading to formations of deposit, generation of sewer-gas, and difficulty of thorough ventilation.

In order that a sewer may satisfactorily perform its ordinary work, it is necessary that all the sewage should be conveyed rapidly to the outlet before a sufficient time has elapsed for the organic matters to decompose. To accomplish this the sewer should be tight, laid to proper grades, and with an interior surface as smooth as can be secured. Now, as the ordinary flow is very small when compared with the storm-water flow, and as this ordinary dry weather flow is insufficient in many cases to maintain the necessary velocity in the sewer, deposits occur, and the generation of sewer-gases commences.

It is of importance that good ventilation be secured, but the large volume of contained air offers great obstacles to its successful accomplishment. A large proportion of our sewers were originally constructed for the purpose of first securing drainage of the soil, and the benefits thus derived have been great and are well understood. Large tracts that were originally swampy and unfit for habitation, have been well drained and made wholesome and desirable localities by these means. The methods employed to mitigate the evils of our system have been occasional cleaning and flushing, ventilation being in some degree secured by the use of perforated man-hole covers. Some of the sewers first constructed were built entirely without man-holes, and hence an examination of these lines or the flushing out of their deposits is not easily accomplished. Others were built with man-holes covered with wood, the covers being put below the street surface and covered with earth.

Topographically our city is generally very favorable for good drainage, the grades of nearly all the main sewers being such as insures their quick discharge. At present the sewers are in a very fair condition, nearly all the main lines being quite free from deposit. The smaller sewers and laterals are also in good order, a recent examination disclosing but few cases where unwholesome deposits exist, and these generally in sewers constructed years ago.

The comparative extent of our sewer-system can be shown as follows: The total length of the sewers is about 18 miles, or about 13 per cent of the length of all the streets, and about 27 per cent of the streets that have been improved by grading or otherwise. Of the different kinds of sewers we have of brick, eight miles; vitrified clay pipe sewers, seven miles; cement pipe sewers, one-half mile; and wood sewers, one and one-half miles. The period of wood sewer construction ended about 1868, although the last constructed was built in 1870. Many of the old wood sewers have been abandoned and the rest will fail within a few years. The earlier built brick sewers were more or less faulty in design and construction, some being built at a depth too slight to permit their satisfactory use for the drainage of houses. Man-holes were almost entirely omitted, and sand was freely admitted from the streets. It was a common opinion that sewers should be large enough to readily admit the man who should clean them.

One of the greatest questions is that relating to the manner of

SEWAGE DISPOSAL.

The common practice, and that which we have followed here is to discharge the sewers into the nearest water-course. This practice begins at the outset, when the questions of cost have great weight and the evils which follow are least apparent. With increase of population the conditions change, and the stream which was once pure and wholesome becomes foul from the increasing products of the sewers, endangering the health of every community through which it flows.

This evil became so great in England that all cities are now compelled by law to keep all water-courses clear and free from pollution. There are some cases where sewage can safely be discharged into the water-courses, but they are rare.

In regard to the final disposal, the best practice is in the direction of irrigation, and it is not unlikely that our city will before many years be compelled to resort to this method.

It is now in contemplation to construct an intercepting sewer of a capacity to deal only with the dry-weather flow, into which all the sewers now opening directly into the river on the east side should discharge; the intercepter to be carried down the river to some safe point, and to be continued further should the future require it. Should the towns below us suffer from the pollution of the river thus created, it may be necessary to dispose of the sewage by the above-mentioned method of land irrigation. Another question of importance relates to

HOUSE-DRAINAGE,

and this is perhaps of more importance than any question we have considered. It seems to me that the drainage of houses is regarded generally as a simple affair, which can be very easily managed; and that municipal regulations are regarded, not as measures designed to protect us from the dangers of ill-advised or faulty construction, but as exhibitions of authority which can safely be ignored.

Regulations controlling to some extent the manner of making sewer connections and laying house-drains have been adopted by our Board of Public Works, but these are designed more to protect the public than the householder. People generally do not understand that the proper construction of the house-drain is more important than that of the public sewer, so far as health is concerned, and that the proper drainage of houses involves difficult problems which they cannot be expected to be familiar with. It is quite possible that for a long time comprehensive regulations enforced in a careful and thorough manner will furnish the best solution of the matter so far as the general house-drainage of our cities is concerned.

Dr. M. Veenboer, city physician, presented a paper on the sanitary condition of the city, illustrating it by means of a municipal map and a colored chart. He emphasized our need of efficient health supervision by showing that since the first of last June, 322 cases of diphtheria have been reported in the city, of which 137—or 42 per cent—have proved fatal. His paper here follows.

PREVENTION BETTER THAN CURE.

BY M. VEENBOER, M. D., OF GRAND RAPIDS.

According to the preamble of our constitution, the people of this Republic have united themselves for the purpose of promoting the general welfare. In order to carry out this purpose they have to care for the welfare of two classes, the healthy and the sick.

Naturally, man belongs to the healthy class, but when, through ignorance or otherwise, he transgresses nature's laws, he passes to the sick list; and if not then repenting and forsaking his way, he passes to the place whence no one returns.

The unlimited variety and number of objects that apparently surround us, science divides into comparatively a small number of simple substances, and the causes of this variety of combinations into still a smaller number of motive powers. Matter and motive powers constitute the sum total of creation. The knowledge of these and their properties and relations tends in the highest degree to promote our comfort and happiness, while ignorance of them subjects us at every moment to the imminent peril of our health and happiness, and even life itself. We need this knowledge as much in health as in disease.

We find that the operations of the inorganic powers, and the tendency of the forms they construct, are designed to be subservient to the higher order of beings, as vegetables, the unintelligent animals, and finally to man, whom if controlled by him, they benefit in ways innumerable; but whom, if uncontrolled, they injure and destroy. Returning to our two classes we see that they represent living human beings, and both will have to conform to and obey the laws governing human life. The one class is

HUMANITY IN HEALTH.

These have to conform to hygienic or sanitary law, and must study and practice it if they will receive the benefits of such obedience.

Think of the many that are healthy and of the few that appreciate it; of their great use to society, the state, and church, and then of the few efforts society, state, and church make to promote that condition so necessary to usefulness; of the constant danger to the individual of losing his health and his life, and the little thought and study of the principles by which his health and his life may be preserved. We would not like to induce the public to do less for the sick, but we would like to have more done by the public, as well as by each individual, for the healthy and for health; and soon there would be less sick to need our care.

Pathological conditions have created abundance of pathological science, under the names of many pathies, and why do not the great majority of mankind who enjoy the laws of hygiene, demand a hygienic science, and call for professional men who shall be ready to explain the principles of hygiene?

Let Grand Rapids consider how many she has who profess to be skilled in pathological science, who live on the comparatively small community of sick, whose principal interest is to have and

KEEP PEOPLE SICK,

and who have no other than a moral interest to have the community healthy. This number is, according to our city directory of last year, sixty-eight. Now let us turn to the list of those who make it their professional business to prevent disease, and who live, plan, and work for the welfare of the healthy, and we find none but the city engineer. Your health officer is expected to look after the sick; the board of health, though honest and earnest, receives only $100 per annum for each member, and there is no professional man among them; and individual enterprise has not furnished, or the public demanded, a single educated man who makes hygienic instruction his business.

We know that an ounce of prevention is better than a pound of cure, but we have not yet learned to appreciate it in dollars and cents. Let colleges and societies for the prevention of disease be started, and let, henceforth, our papers announce the weekly meeting of the Regular-Hygienic, the Homeo-Hygienic, the Eclectic-Hygienic, the Physio-Hygienic, the Hydro-Hygienic, and the Graham-Hygienic, societies, till all the pathies shall be a thing of the past. As doctors we have

REASON TO DREAD

such conventions as this, for this ounce of prevention will do away with more than sixteen times its amount of cure. There is vital need of education in this direction, and woful ignorance prevails. The parent may listen with pride to the boy of eight who describes the location of St. Petersburg; but at the age of two times eight he can probably not give the location of his liver or of his heart. Much as this subject has been neglected by all of us, it has also one side of encouragement. Our city engineer is continually planning the purification of our air, our homes, our soil, and our water. What he has done and what he thinks to do has been stated and illustrated. and the data furnished in his illustration can be very easily utilized in the future by our board of health. If we had, in addition to his topographical description, an annual record of diseases, with their locality and termination, we might correctly form an opinion as to the causes of them, and more easily find means for their prevention. In order to get this annual record, we need a weekly report of all diseases, of all the physicians, together with their localities. The health officer, if educated by our thorough State Health Secretary, will keep a watchful eye on every one of the infected premises, and, if he does not have to pay the bill himself, will insist upon carrying out every measure conducive to health.

I fancy I see our future health officer start out with this excellent map of our engineer's, in pocket-form, in his hand, marking its surface as he goes—a dot for wells, a cross for vaults, and a line for family slops—feeling assured that when his cross or his line come near to his dot, it will sooner or later bring in reports of physicians. Again he canvasses the city, defacing his map by outlining the ponds, stagnant water, the marshes, the dumping-grounds for street-refuse, and the cemeteries; and if these vicinities are thickly populated, he expects another crop of reports, and a harvest for some doctor. No rest for the man who receives $2,000 a year, and at the suggestion of our secretary, we see our officer canvass the city to count the people by wards, so as to determine the density of the population in a given area. He marks the wards by colored lines, and writes the population in figures. Next our tired officer sits down and notes the direction of the prevailing winds, comparing them with the direction of the streets. And last, but not least, he draws on his map the sources of the drinking-water. He examines it, and finds fifteen grains of sediment to the gallon, of which seven are of organic nature. He sees by the microscope the little bugs of which, for personal satisfaction, he only dreams but never tells.

I imagine I see his pocket-map, improved edition for 1881, with the dots as far removed from the crosses and lines as possible, the stagnant pools connected with the sewer lines, the population increased in inverse proportion to the death-rate, and I hear the people of Grand Rapids, instead of treating the board of health as a meddlesome nuisance, saying to them: "We thank you; we and our children live and are clean."

The President then called for the reading of the minutes of the preceding session, which was done by the secretary and approved.

The Secretary read a letter from Dr. Bela Cogshall, the health officer of Flint, regretting that he could not be present in the convention, and giving several pertinent hints as to the best means of informing the people concerning sanitary matters. He has found the public press the most efficient means in command to disseminate sanitary truths, and recommended that efforts be made in all places to secure a certain amount of space in some one or all of the papers for the publication of matters which would be of general interest to the public, at the same time instructing people concerning their duty.

Dr. Kedzie also thought the people should be stirred up by the daily press, and that the pulpit should not be behind in this respect.

A question was sent to the chair and read: "At what age should a child begin to eat meat?"

To which Dr. Veenboer responded: "When it has teeth to chew it with."

Hon. LeRoy Parker made a few stirring remarks, appealing to the press, pulpit, and public to carry out the work of sanitary reform.

Rev. Peter Moerdyk did not think it was the duty of preachers to do sanitary work. That belonged to the doctors. He spoke of the conventional reticence of the latter on all subjects relative to the prevention of diseases, but attributed their custom of withholding the light from the people, not to selfishness, but to a want of thought.

Rev. D. C. Jacokes proposed to defend the doctors. They were not paid for sanitary work; preachers were. It is the business of the minister to know all there is to be known on all subjects. He ought to disseminate the knowledge thus acquired, and not ask the doctor to ruin his own business. The speaker thought he had a right to say as much, inasmuch as he was the oldest active minister save one in Michigan.

Rev. J. Morgan Smith thought all were to blame. He would not distinguish classes, but would make the work the cause of humanity.

Miss Beach was of opinion that the duty of informing the people did not lie with the physician and clergyman alone. She thought that it was the nurse's duty to teach mothers and sisters the great truths and mysteries of life. The need of the present is to educate nurses, and the speaker was willing to give two hours a week free to all who desire to gain knowledge on the subject.

Bishop Gillespie remarked that he noticed that Bellevue Hospital, New York, to which is attached a training school for nurses, was now advertising for applicants.

Mrs. Turpin, of Chicago, spoke a few words in commendation of the course of the Board and of the cause of sanitary reform.

The Bishop regretted that invitations had not been sent the convention to visit the various public and private institutions. He was confident all would be made welcome at the Union Benevolent Home and St. Mark's Home, and presumed the same would be the case at the jail and public library.

The secretary announced the following committees to examine and pass on the exhibits of sanitary apparatus and appliances in the room:

On Air-Moisteners—Dr. Henry B. Baker and Rev. D. C. Jacokes.
On Sewer-Traps—A. C. Sekell and Hon. S. L. Baldwin.
On Ventilators—Rev. D. C. Jacokes, Prof. E. A. Strong.
On Water-Closets—Hon. LeRoy Parker, Dr. H. O. Hitchcock.
On Disinfectors and Disinfectants—Dr. R. C. Kedzie and Dr. M. Veenboer.
On Sanitary Publications—Rev. J. Morgan Smith and Hon. H. H. Holt.

The convention then adjourned until 2 o'clock in the afternoon.

Third Session, Wednesday, 2 P. M., Feb. 18, 1880.

The third session of the convention was called to order by Bishop Gillespie at 2 o'clock. The secretary being absent, the reading of the minutes of the preceding session was dispensed with. An article on air-moisteners was read by Mr. Jno. K. Allen, who illustrated the paper by means of a sample of an appliance for the purpose of moistening the air of living-rooms.

AIR-MOISTENING.

READ BY JNO. K. ALLEN, OF LANSING.

Mr. President, Ladies, and Gentlemen:—If we have to be careful of our out-of-door sanitary conditions, as we are taught every day by some fresh experience that we must be, it is of vastly more importance that we should use the most effective means within reach to keep the interior of our houses in a healthful state. The worst evils that can exist out-of-doors are alleviated by the free circulation of air and moisture which prevails there.

In our houses we are for a large part of the year deprived of the use of this remedy except to the most limited extent, and then under conditions which bring other perils to health. At the same time, we are all compelled to spend nearly half of our lives in the house; our wives and children more; and for more than half of each year we have to keep the outer air excluded from our rooms, while within them, with our breathing, and our heating and cooking apparatus, we are depriving the air of its vital principles and charging it with deleterious substances. The same evil is seen, though it prevails for more limited periods of time, in school-houses and churches, and other places of assemblage, where it is intensified while it has to be borne by the presence of a multitude of breathers and the high strain that is put upon the heating-apparatus. Every device which can tend to mitigate in any degree these inevitable evils of our Winter indoor life and make it more pleasant and healthful, may justly claim the attentive and favorable consideration of all who seek to promote the sanitary welfare of men.

It is fortunate for the inhabitants of this cold climate that we have warming-apparatus as perfect in model and efficient in action as are actually within our reach. We are often compelled to battle against the aggressive cold when the temperature may be descending at the rate of forty degrees in half as many hours. Then the demand is made for the greatest possible heat from wood, coal, oil, or gas, and every heating-apparatus is forced to its greatest capacity. The warmth must be had; yet as we ordinarily obtain it, it is at the cost of having the air desiccated, devitalized, and charged with noxious substances; and we are forced to breathe this parched air which dries out the throat and irritates the air-passages, and with it the sulphurous and carbonic gases which are thrown off from the coal and produced through the over-heating of the iron,—actually poisonous. These facts are within every one's experience and need not be dwelt upon.

Pure air can be supplied in cold weather by the ordinary ventilating-apparatus only to a limited extent without reducing the temperature below the point of comfortable existence, which may be fixed at sixty-eight degrees. Efficient means are yet wanting to make and keep the warmed air pure and healthful. Beside that which we eat, the air we breathe is the most important factor in giving and sustaining life. As we are constantly inhaling this most necessary element of life, and as constantly dependent upon it, no evidence is needed to show that the air with which we are surrounded should be drawn from the purest sources and should be kept as free as possible from impurities. Under our present system of building, the air in prisons, hospitals, public assembly rooms, and homes, is often brought from filthy cellars, or taken from the level of the back-yard, and is in a condition requiring a careful disinfection before it is fit to be used. It has been shown by actual tests that water has a cleansing and purifying influence upon the air that passes over it. A more perceptible and hardly less important effect is that it lends of its own moisture to the air and makes it more agreeable to breathe and more salutary. It will not probably be disputed that moist air at sixty-eight degrees is more enjoyable and better fitted to sustain life than dry air at eighty degrees. At the latter temperature, aged persons will shiver in a dry atmosphere, the unpleasant sensation being produced chiefly by the dryness, not by the heat alone. These facts are within the compass of general experience and do not need further illustration.

AN "AIR-MOISTENER."

We can easily supply heated rooms with a moist atmosphere by means of an "air-moistener" which consists of a system of shallow pans, the proportion of which are arranged according to the position that is to be occupied and the amount of moisture that is desired. I place before you three specimens for the purpose of being better and more readily understood.

The popular form has a fountain at the top, supplying the pans through a valve. The depth of the water to be retained in the pans is regulated by a thimble, the overflow through which is received in the next pan below, and so on to the next below and the next, till the lowest pan is filled and the whole apparatus is supplied.

The same device is applied as a section of the pipe which conducts the hot air from the cellar to the room. This is fed by a small water-pipe at the top with a faucet to regulate the quantity of water to be admitted; and an overflow thimble in the bottom pan is connected by a pipe with the wastage sewer. By means of this device the apparatus may be self-washed; and the waste-pipe may, if desired, be employed in slowly carrying off the foul water of the pans and the poison which it has absorbed.

The moistener is available for service as a fumigator in a moment. We simply put rose-water, oil of tar, carbolic acid, or whatever substance we may desire to use, into the top of the moistener with the water, then raise the fountain valve and let the pans be filled, and we instantly gain the service of an efficient fumigator.

The No. 5 side-wall moistener will evaporate from fifteen to twenty-five quarts of water a day, and the No. 6 even more, according to circumstances. The furnace-pipe-moistener will evaporate any amount according to surface space given it. Nine different forms are made, and all are ornamental as well as useful.

The average Winter temperature of about 32 degrees F. gives us generally a pure and healthful atmosphere, but one which cannot be long endured without vigorous exercise. It must be heated if we would sit in it. The good old fashioned way was with a wood fire in an open fire-place, which cheered with its glow, brought its own ventilation, and did not dry or defile the air we had to breathe. That is unavoidable now. The modern ways, which we are in a measure compelled to use, are by the heater which brings the air up too dry; or the unventilating and noxious steam-pipes. If we were asked why the latter system is objectionable, our reply would be that it does not bring new air into the room, but merely cooks over the old breaths, fumes, and emanations which were already in it.

Remember that for every degree the air is warmed under ordinary heating conditions, the vitalizing force in it is reduced, and the amount of moisture that needs to be added to make it agreeable and wholly exhilarating is increased; even if the air is charged with moisture at the low temperature, it is rarified by the heat till its capacity for absorbing moisture is enormously increased, and when the temperature required for comfort is reached, it becomes oppressively dry, irritating, and injuring the throat and lungs, which it drains of the moisture they contain and which is essential to the healthy exercise of their functions. Families are often made sick from that cause alone.

As a test of the heat of furnace air, we may hold a thermometer in front of the register. It will sometimes indicate a temperature nearly one hundred and eighty degrees. It hardly needs an argument to show that such air must be deficient in moisture and vitalizing force. You cannot breathe it. An apple there would shrivel in an hour.

The evaporation of pure water in the room through the use of the AIR-MOISTENER is the most effective way to supply the moisture and increase the purity in the air.

REPORTS OF COMMITTEES.

The several committees then made the following reports:

REPORT OF COMMITTEE ON WATER-CLOSETS.

Mr. President:—The committee appointed to report to this convention upon the water-closet appliances placed on exhibition, would respectfully report as follows: The exhibit consists of one Jennings' water-closet and one model of McKissock's patent water-tank. The former exhibited by Sproul & McGurrin, of Grand Rapids, and the latter by the manufacturer, James Hay, of Alleghany, Pa. The Jennings' water-closet has a well-earned reputation as being convenient and calculated to prevent the escape of sewerage-gas. Its excellence is attested by the fact that it has been extensively used throughout the country. The water-tank exhibited is simple and effective for the purpose for which it is designed.

Respectfully submitted.

LEROY PARKER

Chairman.

REPORT OF COMMITTEE ON DISINFECTANTS AND DISINFECTION.

The committee appointed to report on the exhibit of disinfectants, finds but a small array of materials on exhibition. Two bottles of Little's Soluble Phenyle, an ozone-generator, and an apparatus for use of carbolic soap to disinfect sewage, are all the materials we find on exhibition for our examination.

"Little's Soluble Phenyle" is a solution of one part of carbolic acid in 100 of water, and costs 3 cents a gallon; may be used with vaporizer or spray-bottle to deodorize and disinfect the air of sick-room or any place needing disinfection.

The public need to discriminate between a disinfectant and a deodorizer. A mere destroyer of odor is of little worth. It is not the smell itself which causes sickness, and to destroy the smell does not necessarily make us safe. No destruction of smells or disinfection of any kind can take the place of *removal of filth. Cleanse and purify first*—then disinfect and deodorize.

"Little's Soluble Phenyle" is a very cheap preparation, and may safely be used where a liquid disinfectant is required, such as disinfecting the excretions of persons laboring under infectious or communicable diseases, the clothing and bed-clothes before they are washed. The danger is in supposing that it may safely replace rapid removal and speedy and careful cleansing.

The artificial generation of ozone has been a favorite plan of promoting health in dwellings, etc., and several means have been placed before the public. The quantity of ozone that is actually produced in most of these generators is exceedingly small, and the influence of any quantity actually formed by any apparatus that has ever been brought to the attention of your committee, so far as influencing the health of persons occupying rooms containing such generator, is problematical. No ozone-generator has been made which will keep the air of an inhabited room pure without good ventilation, nor can any number of ozone-generators take the place of ventilation. Ozone cannot decompose carbonic acid, nor can it restore to air the oxygen withdrawn by the process of respiration. The claim that ozone-machines can dispense with the use of ventilation in school-rooms is preposterous.

While we would encourage all experiments for determining the effects of ozone on the sick, or its uses in preserving health, we would warn the public that it cannot replace the process of air-purification by air-change or ventilation. The ozone contained in the keen northwest wind of to-day which seeks so persistently to enter all rooms, contains vastly more ozone than any machine can generate in a closed room shut off from nature's store-house of pure air.

R. C. KEDZIE,
M. VEENBOER,
Committee.

Grand Rapids, Feb. 18, 1880.

REPORT OF COMMITTEE ON AIR-MOISTENERS.

Mr. President:—Your committee on air-moisteners respectfully report that it has examined those manufactured by I. W. Parmenter, 15 Murray st., New York, and exhibited by E. O. Kelley, of Lowell, Michigan. The committee has found them simple and very convenient apparatus for supplying moisture to the air. Your committee consider that in this climate it is desirable to add a proper amount of moisture to the air of rooms whenever the air supplied is heated, and that the air-moisteners exhibited are useful appliances for this purpose.

HENRY B. BAKER,
D. C. JACOKES,
Committee.

REPORT OF COMMITTEE ON SANITARY PUBLICATIONS.

The committee on sanitary publications have examined an exhibit of them in English and Italian, made by Mr. Jno. K. Allen, of the State Board of Health office at Lansing, and report:—

1. That the exhibition is superior, and deserves a certificate of acknowledgment from the proper authority.

2. That we recommend the establishment of a health column in the press of each place where a journal is published, in which the board of health shall condense all valuable knowledge on this subject. We also advise boards of health to secure the sale of tracts upon hygiene at the counters of book-stores at as low a price as possible.

3. They also recommend that persons capable of writing suitable articles on sanitary subjects be encouraged to publish them in the press of their own vicinity.

J. MORGAN SMITH,
HENRY H. HOLT,
Committee.

Grand Rapids, Feb. 18, 1880.

The President invited the Vice-Presidents to take the chairs provided for them,—responded to by those present taking the designated seats.

Minutes of the morning session were then read by the Secretary and approved.

The President then introduced the Rev. J. F. Conover, of Kalamazoo, who read his paper entitled the "Relation of the Clergy to Sanitary Reform."

THE RELATION OF THE CLERGY TO SANITARY REFORM.

BY REV. J. F. CONOVER, OF KALAMAZOO.

There is no part of the social conditions of mankind that christianity does not touch and ameliorate. And as its divine Founder constantly went about doing good to the bodies of men, so his followers have shown a like disposition to care for the sick, the disabled, the ignorant, the exposed, and the perishing. They are taught to do this as the children of one Father, and because one member of the great human family cannot suffer except as all the members suffer with it. This fact of christian teaching is confirmed by human experience, and the operations of your useful and honorable association are in large part based upon it. Lord Bacon somewhere observes, that nothing which promotes the welfare and safety of a fellow-man can be indifferent to him, and so must the clergy of the church of Christ say and feel, by virtue of the fundamental principles and essential character of the religion they profess.

It is many times indispensable that we instruct a man in the care for his body before we can secure his attention to anything we have to say about the salvation of his soul. His personal wants and condition must be first looked after, and his surroundings modified or changed if we would do anything for him spiritually. We know that in those households and in those localities where there is special work for sanitary reform to do, the efforts of the clergy produce the least result. The crowded and unhealthy tenements, the promiscuous relations of sexes, the ill-cooked and unwholesome food, the foul air and repulsive odors within and without, the exclusion of the blessed sunlight from dark, damp basements and back chambers, and the sullen or sickening poverty which broods over all, withstand the gospel at every point. There is a most intimate relation between squalor and sin. Many forms of base and violent sin are the efforts of coarse animal natures to alleviate or overcome their environments. And yet while the clergyman beholds the extreme difficulty of prosecuting his special labors here, he is also conscious of the fact that his labors are most needed here. If he were to enter upon a practical preliminary work which would open the way for the effectual introduction of gospel truth, it would be a work of light, air, cleansing, separation, and wholesome food—in short, it would be the work of sanitary reform. In this plain statement of well-known facts we trace an obvious and important relation of the clergy to sanitary reform. Under given circumstances the prosecution of this reform becomes one of the greatest, I might almost say the only effectual temporal aid in his special work as a clergyman of the church of God.

In a particular aspect, we might speak of christianity as in itself sanitary reform. It inculcates a just honoring of the human body and hence enforces purity and temperance. The christian is to present his body a living sacrifice, holy and acceptable to God—to honor God in his body—to remember that Christ when on earth chose to use such a body and now chooses from his exalted position to make it a temple for the indwelling of the Holy Ghost. The honorable, intimate, and saving relation, as a member of Christ, which the baptized believer sustains to his Savior, ought to make it impossible for a christian to be indifferent to the purity and health of his body. Therefore, when christianity is introduced into such squalid and vicious homes as I have been speaking of, it at once begins to exert a power to elevate, purify, and refine them. By the new aims of life, the awakened sense of self-respect, the new range of duties, the new applications of restraint and self-denial, which it introduces, it lifts up the household, and starts its members upon a new existence. There is a marked difference between the homes of the pious poor and the vicious poor. The man who cultivates purity within will manifest it without. Christ compares the gospel to leaven which put into the heart of a man leavens every part of him and influences all his relations to his fellowmen. History teaches us how the gospel has leavened races and nations. Experience teaches us how it has leavened individuals. It is the power by virtue of which all things become new. The traveler in Palestine observes that "In every village where christians are there is activity and vigor, while all places which are purely Islamite look as though they had been smitten, as with palsy, by some withering and irreparable curse." "In villages on the Lebanon, christian homes are known by the glazed windows, which have taken the place of wooden shutters that men and women may read their bibles through the Winter storms."

It appears, therefore, that while as an external operation, sanitary reform comes to christianity with valuable preparation and help, christianity itself where it has opportunity to work, implants principles within men which not only work outwardly into these results of an external character which sanitary science aims at, but becomes a permanent power to perpetuate the results which have been attained.

At a public meeting in England a few years ago, in the interest of sanitary reform, Lord Shaftsbury, who presided, made the remarkable statement that there were one hundred thousand preventable deaths in England every year. Dr. R. C. Kedzie, President of the Michigan State Board of Health, in his annual address in 1878, declared that it is possible by sanitary care and regulation to prevent half of the sickness and deaths that occur annually in this State. Such statements as these ought to inspire universal attention. The statistics of death by war and pestilence pale before them. If they were realized as they ought to be, the board of health would be the most carefully composed, most active, and best supported public body in every community; while as the case now is, it attracts little attention and seems to have few duties and certainly commands very little popular support. But while we look with amazement at the magnitude of these statistics, we are to bear in mind also the individual and aggregate pain, suffering, and bereavement they represent; the poverty that has come or has been promoted through them; the exposure of orphaned children and widows; the increase of pauperism; the loss by society and the state which came of the needless destruction of life,—for by what we have seen to be the value of the lives of other men and women in work, in care, in accumulation, in teaching, in helpfulness, in protection, in virtue, and in example, we may estimate the value of the lives of those now dead and dying, who might have lived and who ought to live.

The interest of the clergyman in such facts as these must be immediate and profound. He must be interested personally, as a man, for in his person and in the prosecution of the work of his office, he suffers as do others from the neglect and disregard of the laws of health; the inadequate light, the faulty heating, the needless dampness, the poor ventilation of the houses of worship in which he officiates, not only contribute to the injury of his health, but have much to do in detracting from the full effect of his work. The soporific effect attributed to the sermon is often the fault of the architect who has made no proper provision for pure air inside the church building. The poorly-heated church (and no one can be warm in foul air) drives the congregation away, to which end also there is much help in the cheerless gloom that pervades large sections of the church interior. The impaired eye-sight, the prevalent throat-disorders, the nervous exhaustion of the clergy, can be traced in large part to a disregard on their own part and on the part of others of some of the plainest laws of health. I have sometimes thought it would be well to add to the regular church committee one upon hygiene. There might, with an efficient committee of this character, be less potent smells of decaying wood rising from the cellar, mingled with the musty odors of damp walls and escaping gas;

fewer people sickened from sitting in the draft from an open window on one side of the church while the foul air driven thence almost suffocated those in other parts of the building; the heat of the building regulated otherwise than by a single thermometer placed near the entrance, and which exhibits a changed temperature every time the door is opened, while clergy and congregation almost roast at the other end of the building; and that the church-building might be thoroughly ventilated, and filled with pure air so that it would not be necessary to heat over (when the lighted gas lends its powerful aid), the fetid exhalations of the morning for respiration by the evening worshipers.

The duties of their office take the clergy to the homes of the sick in their respective cures, and these duties are made all the more difficult and dangerous from the neglect and violation of sanitary laws by those who are sick and by the attendants caring for them. They find themselves in narrow, squalid and foul apartments where every circumstance opposes recovery and thwarts the spiritual consolation they would bring—where the dampness, the lack of drainage, the pestilential deposits of the neighborhood, make it apparent that the sporadic cases of sickness will soon be augmented by others until the dimensions and the destructiveness of the pestilence are attained. The exposure and exhaustion of the clergy at such times, while they have labored for the stricken and suffering with a courage, fidelity, and effectiveness that have extorted praise even from scoffers, is matter of both remote and recent history. But how much better for them and for those whom they serve, were the conditions such that their labors should have more probability of success, and that skill, courage, and fidelity should not end in hopeless defeat and death. What a bright roster of the clergy, "faithful unto death", can be called as we read the history of the recent epidemic in our Southern States!

Not a few of the most eminent clergy have felt a special responsibility resting upon them in regard to sanitary requirements and effort, and have endeavored to prepare themselves to meet that responsibility. Sidney Smith devoted some time to the study of medicine and used his knowledge to the best advantage among the sick, ignorant, and poor of his cure. Charles Kingsley was not only a most effective advocate of sanitary reform in the pulpit and on the platform, but when diphtheria invaded Eversley he contested its progress with brave effectiveness, both seeking to remove the causes which excited or augmented the disease, and applying personally those remedies and that nursing care which he had obtained knowledge of by consultation with the best medical advisers. And what is true of these two noted clergymen is true also to a greater or less extent of Arnold of Rugby, of Robertson, of Augustus Hare and others who might be named.

> "In misery's darkest cavern known,
> Their useful care was ever nigh,
> Where hopeless Anguish poured his groan,
> And lonely Want retired to die."

But far higher in dignity and importance than the causes of interest by the clergy in sanitary reform, thus far alluded to, is the fact that every dying person has an immortal soul, for whose salvation Christ died. The clergyman thinks of them as "Sheep having no Shepherd"—as men who could in so many cases truthfully say, "No man cared for my soul." They are his neighbors, whom he is commanded to love as he loves himself. They are friendless travelers beaten and robbed by the wicked world they travel in, and he would not go by on the other side while some good Samaritan is left to wash their wounds, bind them up and pour in oil and wine upon them. They are the poor to whom the gospel is preached, if so be that our Lord's command is obeyed. The deep and practical interest shown by such associations as this in the bodies of men, that they may be preserved from sickness and pain, ought to be a natural stimulant to "provoke to good works" the clergy in care for their souls. And so we come to see that the work of the sanitarian, who in many ways gives access and opens opportunity for the clergyman, and the work of the clergyman who comes in to add to the care of the body such instruction and help as will promote the "health of the soul" and save it from death, are united in this one grand result: the saving of the whole man.

Each may work more wisely than he knows. It is quite possible that the enthusiastic advocate of sanitary reform may prosecute his work in contempt of christianity, saying in his heart that a good Samaritan is better than a heartless priest or a selfish Levite, and yet be all the time doing a work that is in the very spirit of christianity, and which the christian clergy will be glad to avail themselves of. Even so Christ used the unselfish service of the good Samaritan, to illustrate the requirements of the gospel, and point out for all time the natural offices of christian love. There are two ways of improving the condition of a man: first, you may use every available agency to help him in the place where you find him—cleanse the spaces about him—purify his house and his person—let in the air and sunlight upon him—procure for him proper medical care—supply him with warm clothing, wholesome well-cooked food, and nursing care. This would be the natural process of the sanitarian. Or second, you may take the man away from the place where you find him in want, squalor, and sickness, and put him in pure and wholesome quarters, where all his wants will be attended to. This the church does, when from crowded attics, dark basements, and blind alleys, she gathers children into her asylums, widows and old men into her homes, street boys and girls into her industrial schools, the sick and crippled into her hospitals. She does not do it as a sanitary work, but as that blessed manifestation of christian love which Christ enjoins upon every disciple. Her ultimate thought and purpose in what she does is that in all this natural beneficence, wherein the church shows herself "the friend of every friendless man," she may win the man to Christ and promote his salvation. And yet all the time she does a most valuable sanitary work, only that in her case the christian purpose has precedence.

There is another relation of the clergy to sanitary reform, of which I will speak in closing, and that is the relation which comes of their great opportunities. As public teachers they can do much to form a correct public opinion in relation to sanitary requirements. There is much matter published in your own proceedings that might profitably and appropriately be spoken of in the course of sermons, or be reproduced in week-day lectures. There are admirable health tracts now being issued which they might call attention to and help circulate. There are most valuable sanitary contrivances that those they work among would be glad to know of, and which they could find many proper occasions to speak of.

But we may look at these opportunities from even a higher standpoint than this. It is often the case that the leading men of a village or city, who are charged with the administration of its affairs, and responsible for drainage, pure water, or the removal of various sanitary hindrances, within the range of their authority, are christian men also, and yield to the obligations of christian requirement. They may be indolent or neglectful, or awaiting the better support of public opinion, and so do not act. There are themes of christian citizenship, social and personal responsibility, that may be used by the clergyman to arouse the conscience and activity of such men. I have known a whole neighborhood filled with miasma and terrible diseases engendered year after year, and that too among the poorer classes, who could least bear the burdens of sickness, because a professedly christian man who owned the adjacent swamp, refused to incur the expenditure necessary to drain it. And so it often happens in our great cities, that manufactures greatly prejudicial to health are maintained by church members in the midst of dense population. And again the wretched tenement houses of cities, where every safeguard of health is defied—breeding-spots of pestilence, and horrible schools of vice, belong to the estates of professing christians. There are also various manufactures carried on by christian men where no proper regard is paid to the health of the workmen, when it might easily be otherwise; and the same may be said of men set to foul and sometimes dangerous work in underground occupations. The golden rule may be opened in these cases to measure the relations of men—the duty to bear one another's burdens expounded—the duty to the neighbor, which forbids one man to "hurt another by word or deed" set forth, and many other truths like unto these be gathered by the faithful clergy from the great treasure-house of the gospel, and applied to the consciences of those who need them. It is not personal correction, in the form of individual assault, that is required, but the loving and yet close application of general principles —God's truth, were there no examples present to show how very true it is. It is as necessary to have a correct general opinion on such matters as to affect the consciences and actions of individual offenders; for men die but principles remain. And the principles so evolved may be put into action by christian men in future time and result in better homes for the poor, more care and consideration for the laborer and the artisan, and a higher sense of responsibility in the promotion of public health.

If the clergyman be well informed in regard to sanitary requirements and appliances he will also have many opportunities to make a timely suggestion as he visits the homes of his people. He can suggest modes of ventilation, point out the injury of too much shade, the best modes of reducing dampness, the importance of pure water, the danger from offal and foul sties or stables often found near houses, and which become fruitful sources of disease, the best modes of disinfection and limiting contagion, dropping hints about nursing and even about wholesome food and cookery. "Errors in diet," forcibly observes the President of the Michigan State Board of Health, " become the direct or remote cause of a great many diseases of the nervous and the circulatory as well as of the digestive system; and they intensify the activity of many diseases which they do not cause. If our people could be taught to preserve and prepare food so as to secure the best dietetic results, preventive medicine would have won a grand victory."—(Annual address of 1878). The clergy can help achieve this victory by circulating the admirable tracts issued by Miss Juliet Corson, of the New York Cooking-School, which contain a large amount of practical information on selecting food and preparing it for the table, and other similar publications which can be obtained.

In conclusion, Mr. President and gentlemen, members of the State Board of Health, I thank you for the invitation which has enabled me to be present on this occasion, and for the opportunity afforded me to express for myself, and I am persuaded I speak also for others of the clergy, our appreciation of the importance of the work you are doing, to call attention to some points of manifest contact in our respective fields of labor, to show where and by what modes we may coöperate to promote the welfare of our fellow-men, and to declare our readiness as clergymen to work together with you wherever the way is opened.

Christianity is indeed exacting in its duties, exacting in its requirements of holiness, and sublime in the destiny it would secure for every one; but it is also altogether practical in its operation, infusing itself into every part of the daily life and work of men, and drawing all hearts together by the sweet constraints of its law. It was said of its divine Founder: "The common people heard him gladly."

J. F. CONOVER,
Rector of St. Luke's Church, Kalamazoo.

The President then announced that he had placed some copies of Miss Corson's work entitled "Fifteen Cent Dinners for Families of Six," on the table for distribution, and followed with some remarks endorsing the authoress and her plan of work.

The Secretary then read Mrs. Stephen H. Ballard's article entitled "Cooking."

COOKING.

BY MRS. STEPHEN H. BALLARD.

Boswell has defined man to be a "cooking-animal," and certainly, man is the only animal who does not consume his food as presented to him by nature. But when the first dish was cooked remains a mystery—tradition is silent. It may have been the result of an accident and perhaps followed closely upon the discovery of fire, but whether appetizing or not, it was the first link in a long chain reaching down through all the ages.

We are all anxious to live as long as may be, and in as comfortable a condition of bodily health as may be, and are generally willing to employ all available means to that end, but one of the most important of all is very apt to be underrated, viz., well cooked and suitable food. It has been said by a noted writer that "the person who decides what shall be the food and drink of a family and the modes of preparation is the one who decides to a greater or lesser extent what shall be the health of that family." Food supplies and makes good to us the daily waste of the body, furnishes heat and strength, brain, nerve and muscle power; and as most of our food requires more or less preparation before using, it is of the utmost importance that time and thought should be given to it—in fact, whoever would be a good cook must give the mind to it. Brain and education are needed. Some foods are particularly adapted to certain states of the system, others injurious. If the saline matters in the blood are deficient, vegetables restore the equilibrim; alkaloids retard the wasting processes of the body; oils and fats supply other deficiencies.

The absence of food of a proper kind, in due quantities, and well cooked, is the cause of much more of the sickness, languor, mental depression, etc., than is commonly imagined, or would be easily believed. Workhouses, schools, prisons, and many other institutions are often supplied with food in a "go-as you-please" way, upon no principle whatever, and the death-rate is increased. A recent revolting instance has lately come to light in the "Fold of the Good Shepherd," in New York, where were found under the charge of the wolf in sheep's clothing who conducted it, a number of half-starved, miserable children covered with sores. This reverend (?) gentleman must have held in great respect the memory and example of the world-renowned Mr. Squeers of Dotheboy's Hall, who made it a rule to give to each scholar before breakfast a tablespoonful of sulphur and molasses, ostensibly out of anxiety for their health—though the rule which was most rigidly adhered to had the desired effect of taking away all appetite.

In manufactories where young children are employed they are apt to be overworked and underfed, thereby stunting and dwarfing them for all time, not only in body, but often in soul, as so intimate is the connection between a well and rightly fed body and a vigorous, healthy soul, that one cannot be neglected without the other suffering. In a medical point of view the principle to be followed is, that the food and labor bear a just proportion to each other, and when the quantity and quality of the food is not limited by the expense, the best possible condition of the individual is attainable. But I must say that though attainable, it is not generally attained, as a thousand and one things interfere—care, worry, preoccupation, over and under excitement, etc. —preventing the proper digestion of the most suitable and best prepared food, and consequently the proper nutrition of the body.

The above principle of the due proportion of food and labor, holds good with animals also, and was strikingly illustrated in the fast stage lines of olden times. The proprietors found that a horse could go at speed as many miles per day as he could eat quarts of oats, and they would give much more for a horse who would eat 16, 18, or 20 quarts, than for one of more delicate appetite, no matter how handsome.

It is said that "he who makes two blades of grass grow, where only one grew before, is a benefactor to his race. Is not also he who by skill enables raw material to feed a larger population, or who renders articles eatable which were formerly rejected as unpalatable, equally a benefactor?" In France the science of cookery is much better understood than here; there it has become one of the fine arts. The French cooks will prepare delicious dishes out of material which we throw away, and charming soups out of discarded odds and ends, and they understand to perfection the art of garnishing and serving so that the eye as well as the palate may be pleased. A list of the summer vegetables which are exhibited on New York hotel tables being shown to a French "artist," he declared that to serve such a dinner properly would take till midnight. It is related of an English nobleman who had imported a celebrated French cook at a salary of $2,500 per annum, that on one occasion, an elaborate soup being served, Lord —— added a little salt to it. The offended artist sought an audience and told his master that he saw his services did not please him, and requested leave to return to Paris. Nothing could induce him to remain; his soup was a work of art which he considered perfect.

Hume, the historian, did not scorn to cook. In one of his letters he says: "I live still in my old house which is very cheerful and elegant, but too small to display my great talent for cookery, the science to which I intend to devote the remaining years of my life. I have just now lying here on the table before me a recipe for making 'soup *a la reine*' copied with my own hand; and for beef and cabbage (a charming dish), and old mutton and claret, nobody excels me. I make also sheep's head broth in a manner that my friends speak of for days after, and the Duke would bind himself apprentice to learn it." Hume's style as a historian is said to be cold, but his style as, shall we say, a cook is certainly enthusiastic, to say the least.

Among the ancients men of great renown dabbled in the kitchen, and in the time of Homer, kings dressed the meats destined for the royal table. In the time of Pericles professional cooks were so skillful that they could serve up a pig "boiled on one side, roasted on the other, and stuffed with spiced thrushes, eggs, and other delicacies so adroitly that the guests could not discover where the animal had been divided." At one feast an elephant was served whole, inside the elephant was an ox, next an antelope was deftly taken from the ox, inside the antelope was a lamb, that being opened was found to contain a rabbit, the rabbit concealed a pheasant, the pheasant a robin, and last of all was found a humming bird. This gigantic dish was perfectly done and spiced in all its parts. Artificial means were used to provide delicacies for the table; snails were collected and fattened till their shells would contain several quarts; fish were also fed, and pigs revelled on figs and whey. One old gourmand composed a single dish which cost him $40,000, and in four months his kitchen expenses amounted to about $25,000,000. The Spartans on the contrary lived so plainly that a stranger tasting of their black broth said that he was no longer astonished that the Spartans were so fearless of death, as dying was preferable to living on such execrable food. The Egyptians kneaded bread as we do, only instead of their hands they used their feet. In the reign of Queen Elizabeth, cooks were classical scholars. In the time of Louis XIV. a famous cook committed suicide because a dish was late. In the reign of Louis XV. simpler modes of living came into fashion, and many noted culinary artists being thrown out of employment, they instituted restaurants which at once found favor with the people, and do so still. A recent French cook prepared all food chemically and scientifically, and made of the kitchen a laboratory. His works on the art of cooking are said to be unrivalled.

In this country food is more abundant and more neglected than in any other part of the civilized world; abundance of splendid raw material is ruined in the process of preparing it for the table. Bread, that most important element in the health and happiness of mankind, is too often anything but what it should be. It is written "that the divine principle of beauty has its reign over bread as well as over other things. It has its laws of æsthetics, and that bread which is so prepared that it can be formed into separate and well proportioned loaves, each one carefully worked and moulded, will develop the most beautiful results."

The movement of the present day in favor of cooking-schools is a very desirable as well as practical one. Miss Juliet Corson, the superintendent of the New York cooking-school, has done a great deal for the benefit of humanity, especially of the working class. She has given a great deal of attention to preparing cheap and nourishing meals with the least possible expense, and has published a little book called "Fifteen cent dinners for a family of six" (the dinner for the whole six only costing fifteen cents), for free circulation. Also another called "Twenty-five cent dinners for a family of six," which is a little more elaborate, giving the cost of every penny's worth. This is dedicated to workingmen who wish to make the best of wages, in which she tells them that "good food, properly cooked, gives good blood, sound bones, healthy brains, strong nerves, and firm flesh, to say nothing of good tempers and kind hearts," and adds, "these are surely worth a little trouble to secure." Again she says, "the cheapest kinds of food are sometimes the most wholesome and strengthening, but in order to obtain all these best qualities we must know how to choose them for their freshness, goodness, and suitability to our needs; that done we must know how to cook them so as to make savory and nutritious meals, instead of tasteless or sodden messes, the eating whereof sends a man to the alehouse for consolation."

There is also a movement which has been started East to interest women in practical science so far as to enable them to detect many of the adulterations in common groceries, which so materially interfere with good results in cooking, and to keep their eyes open to what is going on around them. For instance, half a teaspoonful of good cream-tartar will dissolve in a cupful of boiling water, while terra alba, or ground gypsum, often mixed with cream-tartar and sold as pure, will not dissolve in any appreciable degree. "The effect of cooking is to soften and disintegrate substances too hard for digestion, and in animal substances, as in roast meat, it partially transforms albuminoid matters, by which they acquire a peculiar and agreeable flavor. This flavor also indicates a chemical change in the albuminoid matters, by which they become better fitted for digestion and nutrition." Unless properly cooked, indigestion instead of nutrition will result, and a long train of attendant evils, unfitting man for work or enjoyment, and sometimes making life a burden too heavy to be borne.

Now, as a rule, we have not as yet many colossal fortunes descending from father to son, the country is too new and comparatively few are able to command the services of first-class culinary "artists," and it is of the utmost importance that ladies themselves should have a thorough and practical knowledge of what so closely touches the health of their families, and be able with their own hands to fill up the gaps left, and correct the mistakes made by inexperienced servants.

The other day I heard a gentleman make in all soberness, the following plain remark: "She may be educated, refined, witty, and beautiful, but for the average man, if she can't cook, she is a delusion and a fraud."

The paper called a response from Bishop Gillespie, who declared that the cooking of a beef-steak is one of the greatest of human undertakings, and one which too often ends in failure.

Dr. Kedzie remarked that there was a tradition that such work came within the province of woman's labors, and expressed the wish that some of them might appear on the floor in their own defense.

Hon. H. H. Holt agreed with Mrs. Ballard that American cooking is the worst in the world. He explained the difference between French and American cookery, the former being ready for the palate. He would hang every man who made table-casters.

Rev. J. Morgan Smith agreed with Mr. Holt concerning the superiority of French cooking, and declared that he himself was a victim of poor cooking—not at home, but while abroad. He had spent much time among people who were desirous of promoting religion, and found that they always endeavored to do it by killing the missionaries. There are probably a thousand ladies who can make a handsome cake, where one hundred can make a loaf of good bread. Instruction is given in the higher grades of cooking, but it would be much more practicable to give instruction in the plainer articles of diet.

Dr. Kedzie referred to the fact that Americans consume more sugar than any other people, chiefly because they do not know how to use the staple to advantage. There is as much sweetening strength in one pound of common cane sugar as in two pounds and a half of glucose or grape sugar. Many people spoil their cranberry sauce and waste much sugar by attempting to sweeten the berries while they are cooking. The right way is to season the sauce to taste after it is cooked.

Dr. Van Deusen being absent unavoidably from sickness, in the absence of his paper the Secretary announced he had papers from O. W. Wight, M. D., Commissioner of Health, Milwaukee, Wis., "On Outlines of a Plan for National Health Department,"* and from Hon. C. D. Randall, of the Board of Control of the State Public School at Coldwater, on the plan of sewerage adopted at that institution, which latter paper was by decision of the convention read by the Secretary. It proved to be a long letter detailing some of the difficulties found by the managers of that institution, and gave a description of the plans decided upon, so far as could be in a general manner by a non-expert.

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* This paper may be found on pages 49-75 of the Second Annual Report of the Commissioner of Health of Milwaukee.

SEWERAGE AT THE STATE PUBLIC SCHOOL.

BY C. D. RANDALL, OF COLDWATER.

The State Public School is situated north of Coldwater city, about one and one-half miles from the center. It stands upon an out-crop of clay about 25 feet above the gravel soil prairie on which the city is located. The level prairie extends to the grounds of the school on the south and twenty rods from it, and on the grounds from the west to within 600 feet of the buildings. The farm north of the buildings is mostly on the clay hill. The clay is of unknown depth. A well sixty-five feet deep was discontinued in the clay. About four miles to the southwest near the old county-seat, Branch, an artesian well was discontinued at the depth of 400 feet in clay and shale below it. The clay at the school is heavy, compact, filled with water. Thorough underdrainage under and about the buildings and for some distance, and graveled drives and walks, has put the place in good sanitary condition as to the soil.

The thorough sewerage of the institution has been one of the matters requiring considerable discussion and consideration. Until the legislature of 1879 made an appropriation for the purpose, there were not adequate means to perfect the sewerage. Supported by the opinion of members of the State Board of Health and the recommendation of the Governor, the board of control, as a temporary expedient, constructed a 12-inch tile drain from the buildings to a dry ravine about 160 rods away and 100 rods from any buildings. The soil in the ravine was peculiarly porous being composed of very coarse gravel, and in it the sewage, about 300 barrels daily, sank away, leaving, however, after a while, a little standing pond about three rods in diameter. The smell from this was sometimes offensive to those passing through the farm, but was not noticeable on the highway about 80 rods distance. But the owner of the adjoining property complained of it as a nuisance, which no doubt it was to him, and the board believing in time it would become a public nuisance, urged the legislature to appropriate a sufficient amount to establish thorough sewerage. The legislature of 1879 appropriated an amount sufficient for the purpose.

Furnished with sufficient means, the board of control found itself confronted by various systems of sewerage requiring investigation, which took their attention for several months, before one was adopted. The two most prominent, were those relating to water-carriage, and to utilization, the first being the one generally used, and the second of more modern date. Part of the board visited institutions in Ohio, where the sewage was utilized by allowing it to pass into reservoirs and from thence was forced by pipes to a distance under ground and there distributed over the surface by use of hose-pipe or by outlets on the side of inclined surfaces.

In the investigations there was found to be an irreconcilable difference of opinion between the advocates of the two methods. If there was a method that was safe to use in a sanitary point, by which the sewage could be utilized and kept from the rivers, the board was desirous of using it, if it was found that the expense would not prevent its adoption. If by modern discoveries and inventions there were found to be scientific methods better than the old water-carriage system, the board was very anxious not to array itself against the conclusions of science. But the board finding such an antagonism between the advocates of both systems, which were equally supported by able men—it saw it must be its own judge as to what system was best adapted to this institution.

After a careful investigation, the board concluded that for this latitude and in our clay soil, it would require an experiment with much expense to determine whether the sewage could be utilized. Also that it was not a settled question whether or not disease might be caused by the distribution of the sewage on the clay soil (even if underdrained) within 100 rods of the buildings. From all the estimates the board believed that the annual cost of running the pumps, attending the pipes and hose in summer and winter, would be $300 to $500, which cost would be above the actual value of the sewage. It was found also that the cost of putting in cisterns, pumps, pipes, etc., for irrigation. would be about $2,000—and that the water-carriage system, including right of way for the tile drain to Mud creek, about 200 rods from the end of the 160 rod sewer, would be about the same amount.

The board believed if the sewage could be disposed of so as to remove it entirely from the buildings, in a way so as not to affect the health of others injuriously, that was the safest and best way.

It was found by a careful survey that the total fall from the buildings to Mud creek was about 45 feet. A sewer to the creek would be the continuation for about 200 rods in almost a direct line of the 160 rod sewer. This creek is about 1¼ miles to the west of the building. It is a slow stream about five feet deep, two rods across, and empties into Coldwater River about half a mile from the nearest point the creek approaches the school. Both river and creek for some five miles pass through an extended marsh which lies on the west and east banks of the river. This river enlarges into a lake and is of considerable depth, a small steamer navigating it in the Summer with pleasure-parties. No one lives on either bank for several miles down stream, by reason of the marsh. The conclusion of the board was that no one could be injured by conveying the sewage to this creek, and that it would be safer for the 300 children in its care to pass all the sewage, including that from the privies, laundry, water-closets, and the storm-water, directly into the tile-drain. It was determined to reduce the sewer from the end of the 160 rod line to an eight-inch pipe, which is sufficient to discharge many times the sewage that would enter it, and the storm-water in the most severe storms.

The sewer was constructed last Fall of the eight-inch pipe, and though there is nothing special about the manner of construction, I will speak of some points. It lies about five feet below the surface. Total fall 45 feet; no fall less than six inches to the 100 feet. It is carefully laid in cement. A rubber disc was kept in the pipe and drawn forward as the work progressed, securing a pipe clean of cement or any other obstruction. About every 15 rods a "T" was used, extending the pipe up within two feet of the surface, which was covered with a stone slab. These places are marked upon the map and are to be used, is necessary, to ascertain obstructions. Just where all the sewage at the buildings enters the main sewer, there is a sand-trap, which stops all surface sand and which operates to float any sticks, rags, etc., that might get into and obstruct the sewer. A wire grate also keeps back anything that could obstruct. There is a hand-cleaning stench-trap below the sand-trap, near which a pipe extends into the smoke-stack of the engine-house—which is 65 feet high. All pipes are trapped where necessary to keep sewer-gas from the buildings. The privies are constructed so that they empty into the main sewer. There is a narrow valley about three feet deep under the privies. At one end of each is a connection with the water-mains, by which water is flooded in, and at the other end is the sewer-outlet. The bottom of the valley has about one foot in depth of standing water. The outlet has an iron, beveled plug, which is raised by a rod. These privies are flooded with clean water every day and work satisfactorily. There is no smell of sewer-gas, or any other offensive smell about the buildings.

At the terminus of the sewer at the west end there is a building about five feet square kept locked from trespassers or animals. The west end is built out about 150 feet on the marsh, and the pipe kept two feet above it to provide against rise of water in the marsh. At the side and above the sewer is earth filled in, piles being driven and board sides put up. There is an open ditch about 15 rods long from the end of the pipe to the creek. Near the end of the pipe is a small pond about three rods in diameter which is of unknown depth. From this a ditch conveys the water to a point near the end of the tile-drain, where it takes up the sewage, and uniting with it continues to the creek. This little pond is a spring which discharges at least 1,000 barrels daily of pure cold water, and never fails in any season. The sewage coming from the buildings is largely of the laundry-water, and is at least 95 per cent water, and has scarcely any color or substance where it discharges. After mixing with the 1,000 barrels from the spring, it looks as pure in the ditch as any water till it reaches the creek.

While ice is being gathered up stream in the river, the outlet of the sewer—the ditch and spring pond—remain open. The whole operations of the new sewer so far has been very satisfactory. No complaint has been made against it, nor can be. The total cost, including $450 for right of way, is about $2,000.

I have added to this hurried sketch an abstract of some of the authorities consulted on the sewerage question. I will say, however, that Dr. Folsom, referred to in the abstract—which was a paper I laid before the board—as well as Col. Waring, a known specialist on sewerage-matters, wrote me that they did not think the utilizing-system adapted to our location.

We believe that experience will show that the system we have adopted is the best possible one to maintain the excellent sanitary condition of our school, and that it is one which will cost comparatively *nothing* to maintain it, while the utilizing system would have entailed a continued annual expense.

I will add that Dr. Lyster, the specialist of the State Board of Health on sewerage, was consulted, and that his paper on that subject and his advice were very favorably considered.

SOME OF THE AUTHORITIES CONSULTED, AND EXTRACTS FROM MY REPORT TO THE BOARD OF CONTROL OF THE STATE PUBLIC SCHOOL.

Extracts from a work "On the Sewage Question," by Frederick Charles Krepp, London, 1867.

"UTILIZATION OF SEWAGE DILUTED BY WATER."

Where it is Successful or Partly So.

"There is no question but that in hot, dry, and arid countries, irrigation itself cannot but produce useful results; and if the moisture applied contains, at the same time, fertilising ingredients, the beneficial results will, of course, be considerably increased. Thus in Spain, Northern Italy, and British India, irrigation on a large scale has proved highly useful. * * The mean temperature is about 75° Fahr., the maximum 90°. * * Those regions have, on an average, 200 clear days of burning sunshine, 125 cloudy days, and but 40 of rain. At Brescia, two-thirds of the entire year, the rays of the fierce sun are unchecked by clouds. These facts, namely a torrid climate and a light, sandy soil, go far to explain the splendid results obtained by the application of large volumes of fertilising water in those countries."

Where it does not Succeed.

"In England, however, these conditions are wanting; nor is there any evidence that, except under fortunate circumstances but rarely met with, this method would be found to pay at all, many lands, indeed, requiring constant drainage instead of additional moisture. The success of the irrigation-scheme, as far as it goes, at Edinburgh and Croydon, is mainly due to causes of very rare occurrence. There sewage is applied without stint and with little expense by mere gravitation, and produces, it is true, heavy crops of grass. *But if the sewage had to be pumped up, as at Carlisle, Rugby, Watford, Worthing, and elsewhere, the balance would also there soon be found on the wrong side of the account.*"

[Several examples are then given showing that on the five Edinburgh meadows, having in all 335 acres, heavy crops of Italian rye-grass are raised. The grass is coarse. The flowage is all surface and no pumping. The soil was originally sand and clay subsoil. Some of these meadows have thus been utilized for about two centuries.]

At Rugby. Seven thousand inhabitants. Sewage collected in tanks. Pumped out with a 12 horse-power engine through iron pipes laid over 470 acres of mixed grass and arable land. Been used 13 years. One tenant began with 190 acres, gradually reduced the area of application until he abandoned the hose and jet altogether, and now confines himself to 20 acres of grass and meadow land. Before 1861 another tenant worked 280 acres, tried the sewage on arable and grass land, and then gave it up by reason of losses sustained.

"Near Alnwick the Duke of Northumberland put down machinery and pipes over some 270 acres, and applied sewage in various quantities to all kinds of crops; and although the tenants got the sewage free of cost, the whole arrangement has been abandoned, the bailiff of the district reporting unfavorably against the use of sewage liquid for corn or any rotation crops whatever.

"The royal commissioners, Prof. J. Thomas Way and Mr. J. B. Lawes, charged with an inquiry into the best methods of utilising sewage," say:—

"*c.* All local circumstances being favorable, profits *may* accrue; *otherwise this system merely serves to aid in defraying the expenses connected with the removal of sewage.*"

Several cities, as Coventry, Ashby-de-la-Zouch, Birmingham, have used settling-tanks, but with pecuniary loss of about 10 per cent per annum on the investment.

Sewage Irrigation Dangerous to Health.

Sir Morton Peto, in a debate before the "Institute of Civil Engineers," said he was "well acquainted with the meadows near Mansfield and Edinburgh; and he must say that, however great the agricultural advantages of the system may be, they would be dearly purchased if the region near any town were infected like the two places mentioned; .... that if the air in the vicinity of all large towns were to be rendered like that of these cities, the direst consequences might be anticipated."

Only 1,000 of the 13,000 houses of Edinburgh empty their sewage on these meadows, and the writer says: "It is not very difficult to imagine the state of affairs if the entire sewage of Edinburgh were applied to those famous meadows!" The author calls this sewage put on the surface by irrigation as "Pestilential liquid."

The testimony of Dr. Capelli, of Milan, on sewage-irrigation.

Question. "Have you observed any influence on the health of the inhabitants from this use of the ground?"

Answer. "A most decided one."

Question. "In what respect has it acted injuriously on the health?"

Answer. "First, in producing every kind of ague; secondly, in producing other forms of disease due to marsh miasma, such as neuralgia, rheumatism, chest inflammations (pleuritis, etc.); thirdly, in sometimes producing pernicious remittent fever, which often kills in a few days."

Question. "Are such diseases frequent among these people?"

Answer. "Very frequent, indeed."

Question. "Is the health of infants and children more especially affected?"

Answer. "Yes, most especially, as is shown in the unusual prevalence among them of scrofula and rachitis." * * *

Question. "Have you observed whether the ordinary organic diseases produced by marsh miasma, such as enlargement and hardening of the liver, enlargement of the spleen, and dropsy, are common diseases among the residents of this place?"

Answer. "Certainly they are. It must inevitably be so."

Question. "Then it is the result of your observation and experience that the diseases you have named are produced generally, wherever irrigation is carried on close to human habitations?"

Answer. "Everywhere; it is so inevitably."

The writer adds: "What must an impartial reader now think of any attempts to prove the harmlessness of the sewage-irrigation system?"

And yet at Milan the most of the solid excrements are collected into water-tight well-constructed cesspools, and only the thinner portions allowed to go upon the surface.

Advocates of the irrigation-system say that for the health of inhabitants the sewage should not be deposited within a mile or so of any dwelling. But even then the poisonous vapors may be driven to the residences by winds. The writer says:

"The sense of smell, so often relied upon in testing the purity of air, is just as far from being a safe guide as that with regard to water. For, even as the microscope has detected myriads of animalculæ in a drop of water, which to the eye appears perfectly clear, so chemical analysis has discovered, by instruments arranged for that purpose, poisonous gases in air that seemed peculiarly balmy and pleasant to inhale."

PER CONTRA.

Some Words from those who favor Sewage-Irrigation.

In Massachusetts, along whose streams there are frequent towns, factories, cities, dwellings, etc., etc., all emptying their sewage into the rivers, the waters have been in many instances rendered unfit for domestic use, and in some cases it has been claimed to cause sickness. In 1876 a commission appointed for this purpose, after a very extensive investigation, reported at great length upon the "*River-Pollution*" of Massachusetts. The Secretary of the State Board of Health kindly sends me the report. The Secretary is Dr. C. F.

Folsom, of Boston. The commission, after reporting the condition, and claiming the rivers should not be polluted by sewage, gives very little advice how the matter can be remedied. They advise *experimenting*, and seem to favor experimenting with sewage-irrigation—but do not appear to consider the question of sewage-irrigation as settled. I will quote some of the language of the commission:

"To change this state of affairs, and to remedy it radically, is the problem now presented; and while those who have been obliged to study the subject are confident that it is not insoluble, it is full of that kind of difficulty to overcome which *will demand great perseverance, some experimenting*, and it may be considerable invention and ingenuity. * * * Our severe Winter climate presents a difficulty by itself which which will require special treatment."

As to sewage-irrigation the "general conclusion" of the report says:

"Of all modes of dealing with sewage, this may be said to be the favorite. * * * The second exception (to its usefulness) is the Winter, when for several months it may be the irrigation-fields will become useless as such."

It is probably true that *no* process or combination of processes for the sufficient purification of sewage-waters has ever produced results which collectively *made it remunerative*, * * * but to attain the desired result without any outlay, *far less* to make it a means of profit, *is not, in the present state of knowledge to be expected*."

"The most successful modes of dealing with sewage, at this date * * * are explained in the separate report of Dr. Folsom."

Dr. F. principally recommends the irrigation-system, and seems to have stronger convictions than the commission.

I will quote some of Dr. F.'s strongest statements.

Conclusions of the Massachusetts Board of Health as defined by Dr. Folsom:

"In public institutions, prisons, asylums, etc., it is our opinion that the sewage can be utilized and purified by irrigation to great advantage, and this disposal of it should be made when the land can be got."

The Board recommends:

1st. No sewage should be allowed to flow into rivers until first purified.

2d. No sewage after being purified should flow into rivers or ponds used for domestic purposes.

3d. Each case should be considered by itself.

4th. Legislation should regulate sewerage.

5th. *That irrigation be adopted, at first experimentally in those places where some process of purification of sewage is necessary.*

6th. All towns of 4,000 population should have a board of health.

Many cases are quoted where sewage-irrigation has been tried in Europe and it is claimed successfully, with no injury to health. All seem to agree that large crops of Italian rye-grass are raised, good for stalls, the sewage disposed of successfully, and that there is no *profit*, that the outlay and expense of running is more than the receipts—that there is a balance generally against its use. Where it has failed and has caused sickness it is claimed the management is bad.

The conclusion I arrive at is in brief:—

1st. In cases where the sewage can be sent into a stream without serious injury to the stream or the people near it, the simplest, safest, and best method is to get rid of the sewage in that way.

2d. If that cannot be done, I believe that sewage-irrigation *with proper* *management can be successfully conducted* so far as *disposal* of the sewage is concerned. That grass for cattle can be raised on the land, and that the annual cost of this method with us will be more than the value of the sewage.

3d. Believing the sewage from the State Public School cannot injure the stream known as Mud Creek, and that it can be taken to the creek for about $2,000, the same as cost of sewage-irrigation outlay, after careful study of the subject and authorities, I believe our best method is to conduct the sewage to the creek.

C. D. RANDALL.

Dr. Kedzie then explained some of the relations of the State Board of Health to the Board of Control of the State Public School, incidentally mentioned in the communication, and congratulated the Board of Control on results.

The President then called on the member of the State Board of Health from Flint to explain system of drainage and sewerage adopted at the Deaf and Dumb Institute. To which the Hon. Le Roy Parker responded, by saying the location was a very favorable one, and needed only the large drain to a ravine and stream which they at present used.

The Secretary then announced the order of evening exercises.

Superintendent Daniels extended an invitation to the members of the Board to visit the public schools, and agreed to show them about.

The convention then adjourned to meet at 7:30 in the evening.

Fourth Session, Wednesday Evening, Feb. 18, 1880.

The evening session began at 7:30 o'clock, Bishop Gillespie in the chair, and was opened by Rev Mr. Jacokes with prayer. The minutes of the preceding sessions were read by the Secretary, and approved.

Prof. E. A. Strong, Principal of the Grand Rapids High School, read the following paper on the subject of "The Health of the Young as Affected by the School and School-Architecture."

HEALTH OF THE YOUNG AS AFFECTED BY THE SCHOOL AND BY SCHOOL-ARCHITECTURE.

BY E. A. STRONG, A. M., OF GRAND RAPIDS.

Before entering upon the consideration of this topic, I wish to say a word about the possible wholesomeness, under the most favorable conditions, of ordinary school-life. There are those—and I confess I have been of the number—who question whether school-life, or, in general, an intellectual life, is not necessarily unfavorable to sturdy health and vigor,—whether, indeed, the race is not slowly undergoing physical degeneracy from over-cultivation. It is not wise to answer this question as is usually done by pointing with a laugh to the commonplace, unanxious school-boy, who knows nothing except on compulsion, and asking if he is likely to die of over-cultivation! Without attempting any serious discussion of the question, is it not quite conceivable that every check which thought, or sensibility, or feeling, or love, or conscience puts upon our natural impulses is a limitation of our native force and vigor. And do we not instinctively feel that these limitations should be as few as possible. Now, are the necessary restraints of the school-room among this number? Let us go, on some bright afternoon, through the rooms of any school-house in the land, and see the flushed faces, mostly either too eager in aspect or too gloomy, bending over books or resting wearily on the hand, and can we feel that this is the right place for these young people? This is a great and grave question, and one, as it seems to me, which is not to be put to rest until a considerable modification of present school habits and methods has been secured.

But while we are thinking of the evils of restraint and over-cultivation, we ought not to forget the evils of license and unrestrained obedience to impulse. Practically most children who do not go to school seem to be in no wise superior, physically, to those who do, and there are very important reasons why it should be so. Indeed the question whether the modern school is or is not favorable to physical health and vigor will be found so much a matter of offsets and balances, so involved with similar and related questions, that we must give over the attempt to trace this particular thread in the tangled web of modern life. But there is a point here of extreme importance. My own thought and experience lead me to believe—and let me say it with some emphasis—that the evils of school-life are casual and accidental rather than essential and necessary; and that under easily obtainable conditions attendance at school should be favorable to health and longevity. Hence the problems of school-hygiene, if difficult, are not hopeless. Their solution indeed demands care and thought and painstaking, but hopeless they are not. As it is important that this should be understood so that we may work with heart and hope, let me enumerate some of the reasons why attendance at school should be favorable to health.

The gist of my argument lies in the immense importance of a regulated life to the physical well-being, a sort of life which parents in general either cannot or will not teach their children, and many elements of which are best taught to children in groups and by men trained for the purpose. The diseases and physical incapacities of our time arise as much from deficient self-control as from overwork; indeed overwork is only one manifestation of deficient self-control. When impulse is allowed to run riot, when peculiarities are cherished, when idiosyncracies are petted and pushed to their limit, the individual, if not already diseased, becomes an easy prey to disease. Now, *the inhibitory power of the will properly encouraged and strengthened, is the only security against this abnormal condition,* and such an education of the will is a proper function of the school.

School-life, too, at its best, induces regular habits; the subjection of whim and caprice to law and authority; supplies a healthy and natural mental stimulus in the place of mental vacuity; gratifies the love of knowledge, of society, of acquisition, of rivalry; and thus produces a steady and moderate exhilaration of the mind, which tells powerfully and happily upon the physical health. And for many young people—so many that the student of social science may not put them out of the account—the influence of school-life is far more and higher than this. The examples of history, the forms and forces of nature, the majesty and supremacy of law, stir many a mind every year in all the schools of the land to a noble zeal for the most useful, the truest, and purest attainable earthly life. Under the influence of this stimulus evil appetites fall away, evil habits are sloughed off, and the timid, willful boy becomes a man fully formed for the duties and the discipline of life. There is a current fallacy, which consists in speaking of this influence as a *mere mental quickening.* The fact is that a stimulus applied anywhere to the individual man is felt through the entire being. We cannot educate or stimulate a man piecemeal. Physical education tells upon the mind, mental quickening is felt through every fibre of the body. Hence the importance of high intellectual and moral ideals, to the physical health and perfection of the race. The living love of something that is pure and good is a force that works in secret and works always. Beside it the best stock of principles learned and conned by rote is, in the hour of temptation, but a rope of straw. Such a love, such an enthusiasm, the school may and often does supply. And even for that class of the community which yields the largest harvest of invalids, even for the children of nervous or ill-matched or feeble or overworked parents—themselves often bright, interesting, self-conscious, excitable, delicate—even for these the school has, or may have, store of good. This great mountain of healthy commonplace calms and sooths these restless and excitable young people. Their individuality becomes less intense or is absorbed into the common life around them. They become less self conscious, less abnormal, more simple and natural. If they are still somewhat over-active, it is at least some comfort to know that they have passed from a perturbed and restless *sea* of feeling to a strong *current* of feeling. The pernicious excitement which spreads all abroad and "embraces nothing in particular—the vague, scattered, and tumultuous species, is replaced by the useful excitement that grows out of the subject itself, embracing and adhering to that subject."

These considerations and such as these seem to me to go far toward establishing the proposition with which I began, that attendance at school should, under favorable circumstances, promote health and longevity. *Under favorable circumstances,*—Ah! there's the rub. How rarely such a condition exists, even to an attainable degree. Let us for a few minutes look kindly, but narrowly, at some of those physical conditions which go far to spoil the fair picture of an ideal school-life, which we have sketched above.

SITUATION OF THE SCHOOL-HOUSE.

Prominent among these physical conditions is the situation of the school-house in the community which it is designed to serve. Now the question of the site of a new school-house is always difficult and perplexing, and only by great care and usually by considerable concessions to local feeling does it escape becoming a source of prolonged contention and ill-feeling. In the strife of contending parties the sole question that should be considered, *What location will be most favorable to the health and comfort of those who attend school,* is often quite forgotten. And we need not wonder that between the conservatives who think that everything should be as it has been, and the radicals who would have everything as different as possible from what it has been, between an ambitious "north side" and an envious "south side," between the thrifty and influential speculator who wishes to "unload" an undesirable piece of property upon the district, and the jealous citizen who suspects some such scheme in every proposed location, the very best site is not often chosen. But surely we may wonder why it should so often happen, even under these unfavorable conditions, that the very worst site should so often be only one upon which all conflicting interests can unite. As a matter of fact the usual position of the western school-house (and I say this advisedly after considerable observation) is the loftiest hill in the immediate vicinity of the town. Now there is no reason in the world why a public day-school should be on a hill, or why it should be at a distance from the homes of the children who are to attend it. The necessary conditions of *quiet, good drainage, pure air,* and *good water* can usually be secured by an approximately central site upon the level of the town. Much is said and justly—indeed I have a word myself to say—about our lofty school-buildings; but really the climb to the school-house is often a more serious affair than the climb in it. Woe to the poor children who have both to endure! I am sure I do not exaggerate this evil. Even putting aside the worst cases, where children are compelled in order to attend school at all to climb by a slippery path or rickety stairs a steep acclivity two or three times as high as the lofty school-house perched upon its summit,—putting aside these cases, enough remains in the ordinary incommodious, bleak, and unsheltered position of the school-site to call for serious animadversion.

GROUNDS AND OUT-BUILDINGS.

The school-site having been fixed upon, there comes the important matter of preparing it for the reception of the building. The grading and drainage of the premises, the location and construction of the out-buildings, and their connection with the sewer-system of the town, if there be one, are points of the utmost importance, and I pass by them only because they have already received attention at the hands of the State Board of Health. One word, however, with regard to the condition of the out-buildings connected with village and city schools of our State. From personal inspection I know that, as a rule, they are in a deplorably bad condition, though I think that there is year by year a little improvement. I fear, however, that there are still few towns where pupils are not driven from school or rendered very uncomfortable while in school by foul or incommodious privies.

They are usually far too small, and absolutely without provision for cleansing or disinfection. In many cases ignorance lies at the bottom of the trouble. A few clear, explicit rules, such as are of possible application by ordinary men under ordinary circumstances, would work wonders. But, above all, the essential difficulty of the problem should be recognized. It is not an easy matter to treat such a case well. I venture to think that any Board of Health, if put in charge of a pair of seven-by-nine privies huddled into a little yard in the rear of a school-house accommodating, or rather holding, five hundred children, which they were to keep clean and sweet through a twelvemonth, would feel a little appalled. And if we add the difficulties, often found, of a low-lying town, without a system of sewerage, underlain by a stiff clay soil always saturated with water, would they not abscond at once, and "go west," to grow up with the country where they could establish a more wholesome condition of things? But after all, many of the difficulties of the case were deliberately, though perhaps ignorantly, thrust into it in the original construction, and can be removed by better construction. The essential conditions of improvement are that people should *understand the vital importance of this matter*, and that they *should know what to do*. School-boards will then be willing, if there is need, to sell off a few acres of ornamental ground in front of the school-house which pupils are forbidden even to cross, that the rear yard and its appurtenances, which are used constantly by the pupils, may be improved.

1. The privies should be large—many times the usual size; there should be two of them, distant from each other.
2. They should be accessible from each floor.
3. The approaches should be screened from view and sheltered from the wind.
4. They should be well protected from the weather, warmed, lighted, and ventilated.
5. They should be inspected daily by the teacher.
6. They should be systematically cleansed and disinfected. The system must depend upon circumstances. If drainage and flushing are impossible, the vaults should be shallow, of good, smoothly-plastered masonry, and easily accessible for frequent cleansing.
7. They should receive attention in the Winter as well as the Summer. Indeed the sanitary battle of the year is fought out in the Winter and Spring.

SIZE OF THE SCHOOL-HOUSE.

Something may properly be said concerning the size of the school-house. And in this matter the preference is always to be given to many small buildings over a single large one however commodious and imposing. For my own part I should be glad to see *four hundred* fixed upon, especially in our smaller cities, as a proper limit of the number of sittings for a single building. A recent writer upon school-hygiene in the "Sanitary Engineer" would place the limit at 1,200. He also speaks with approval of a rule in Berlin, Germany, fixing the highest allowable number of sittings at 1,400. I am persuaded that this limit will seem a wise one only to those who are accustomed to see one or two thousand children crowded into one building. Unquestionably it will cost more to educate two thousand children in ten buildings than in one or two, though the difference need not be very great. The advantages of the smaller houses are very considerable. Some of these, as diminished distance from school, less climbing of stairs. simpler arrangements, and great saving of time in getting into and out of the house, diminished risk in case of fire, prevalent contagious diseases, etc., will readily occur to any one. But the real advantage of the small house lies in the fact that the school life in it may be far freer and more natural than in the larger building. When you have an army you must have army discipline. If this seems to any a small matter it is sufficient to state in reply that very many of the evils of repression and oppression which are charged against the public schools are inseparably connected with large school buildings.

One word more before we enter the school-house—concerning the architecture. It is usually said, "Leave architecture to architects." Certainly, let us leave to architects what of architecture we determine to have, but the main question is, *How much we will choose to have?* Frankly, my own answer to the question is, of architecture as distinguished from construction, of architecture as it consists in attached or appended ornament, of orders and styles and that sort of thing, not an iota. Let us not forget that we western people are poor,—busy and ambitious, but really poor, and that every dollar expended on the outside of the school-house in superfluous ornament will be saved on the inside by curtailing comforts and conveniences. Besides, does anybody in these days know enough to make a beautiful building, even when he has a mint of money to work with? Are not the attempts of the age at fine architecture all miserable failures? And are not those the most satisfactory buildings of the time, which, simple and unpretentious, have arisen, we hardly know how, to answer a real purpose and which express that purpose in every line and stone? In the days when the real styles of architecture were invented and used, men built simply and naturally as they had learned how best to apply their material to their purposes; all alike, but still characteristically because they had characteristic wants to express, and nobly in so far as their objects were noble. In these days of the learned styles, men build out of books, not what they want for their own purposes, but what some other people have found useful. Will you have Norman, or Queen Anne, or Italian Gothic, or Renaissance with some Indian motives? Conscientious and learned men will give you, despite chimney-pots and ventilaters and steam heating-apparatus and all modern conveniences, a thoroughly pure architecture of any period from the time of Pharaoh to that of Victoria. But who cares for a pure architecture? Who is offended if Saracenic forms are mingled with Greek, or Oriental with Gothic? Who doesn't care more that a chimney should not smoke than that the chimney which smokes has mouldings from a dozen different styles? And why should we care? The fact is, the orders and the styles must be ground to powder as a foundation for the architecture of the future, and while this process is going on let us not expend a penny upon those things for which we do not care a penny. For the present, at least, let us take our mouldings, our finials, scroll-work, and other gewgaws, in ventilating-flues, brooms, and tin-dippers. By all means let us have an architect for our school-building and let us trust him; but let us have one who knows what good building is, one who cares more for his *plan* than for his *elevation,* and more for the children whom his building is to serve than for an imposing façade. It will not be difficult to find such a one, I trust it will soon be difficult to find any other.

1. Have no useless ornament, but abundance of good construction.
2. Make much of the artizan, little of the historical architect.
3. Build from within outward. No matter how your building looks, be sure your rooms are where you want them, and as you want them.
4. It will cost something to carry out many of the other suggestions of this paper. Save the cost here.

INTERNAL CONSTRUCTION OF THE SCHOOL-HOUSE.

Passing from the external form, we come now to that which is more vital, the internal construction and arrangement. Here so much depends upon the form, size, cost, and grade of school, that detailed instructions are out of the question. A few general principles may, however, be stated.

1. The advice of intelligent teachers of considerable experience in the grade of school for which provision is to be made, should be carefully considered. But no teacher—indeed no man—unless of unusually wide and varied experience, should be trusted implicitly with the entire construction. I would speak of this with some emphasis, because conspicuously ill-planned school-houses frown upon us from every hillside, and the fault is usually traceable to the ignorance or the whim of influential teachers or members of local building-committees.

Very few men, very few communities, know enough to build a school-house. Why should not the State lend assistance where it is so eminently needed? I do not in general think highly of the efficiency of State commissions in correcting public evils. But is not this case one that peculiarly demands State intervention? At least should it not be required by statute that no important school-building should be erected in the State until the plans were approved by a competent sanitary engineer? I would also strongly urge that some resident physician, known for his interest in hygiene, should be an active member of every building-committee; also recommend that two or three public-spirited ladies be asked to serve in this capacity. Often they would take, and from their abundant leisure and practical sense would deserve to take, a leading part in the preliminary deliberations and their subsequent execution.

2. The means of egress and ingress should be carefully studied. The outside steps should be broad, the landing spacious, and both sheltered from wind and weather. The outer doors should be large, at least two in number, and on opposite sides of the house, and, above all, should open outward. This last feature is easier to get in the plan than in the actual construction. Contractors at the right moment bring forward a substitute which they often find it easy to get accepted, and the change is not noticed until some sad accident

calls attention to it. My list of accidents from high, slippery, unguarded steps is a long one. As well for convenience as safety there should be some space between the outer door and the foot of the inside stairs.

3. This leads me to speak of the stairs themselves—no unimportant matter, as the fatigue of stair-climbing may be much diminished by proper construction. The stairs should not be winding, either in whole or in part. The triangular form of step is very trying to the careful, and prolific in accidents to the careless. This is not a mere theory. A careful comparison of accidents in school-houses where other things were essentially alike and the stairs only different, shows plainly the inferiority of the winding form. The stairs should be broad and low. My own experience would lead me to say, as *as low as possible*, within the limits of space assigned to the stairs. Unquestionably an inclined plane of low pitch would be greatly preferable to stairs if it did not require so much space. But while the "risers" cannot be too low, the "tread" may be too broad. The proper limit of breadth has been exceeded when one is compelled either to stride uncomfortably from stair to stair, or to make an annoying half-step upon each stair. The balustrade should be close and high, or rather the stair-rail should rest upon a continuous wainscoting. Of course there should be a flight of stairs for each entrance and upon opposite sides of the building.

4. With regard to the *number* of flights of stairs, or, in other words, the height of the school-house, I desire to add my testimony to the wisdom of the prevalent opinion that no building for school purposes should be more than two stories high. The almost uniform testimony of parents and physicians ought to be held conclusive on this point. My personal knowledge of the seriously injurious effect of stair-climbing is derived mainly from the testimony of former pupils, many of whom have told me that, although they were not aware of the fact at the time, their health was impaired while at school by going up and down stairs. A fellow-citizen in whose wisdom and good sense we all have abundant confidence was the other day in my hearing ridiculing this statement as absurd. "Nothing is more common," he said, "than for people to be in error about the cause of their ill-health. And besides, many persons are glad to have some popular scape-goat upon which to lay the effects of general carelessness and indiscretion in matters pertaining to health." But the evidence is too overwhelming and too disinterested to be thrown aside so summarily. In a single year I have a record of more than twenty such statements, all of which were so serious and earnest that I am sure they would have impressed any one as true. Nor is it to the point to say that many persons are not injured by going up and down stairs. Certainly this is true. This method of arguing from one person to another is misleading. If there is one hygienic law that this age should have the credit of discovering and applying it is this: That no man should be compelled to do that which experience proves is an injury or hardship to him, because somebody else can do the same thing without harm or discomfort. Is not the world full of men and women who are too feeble to undergo the severest tests of strength and endurance but who have been saved to a life of high usefulness simply by not requiring that they should be subjected to such tests? Especially are the higher schools filled with pupils of this class. Many young persons avowedly continue their attendance at school because some physical incapacity will not allow them to engage in an active calling; while I have never taught in a school where there were not some pupils whose parents had been urged to withdraw them from school on ac-

count of feeble health. I was once moved by some serious cases of this kind to write: "A law for compulsory attendance at school! Certainly, if there is need and it will effect the object; but by all means let us have a law for the compulsory non-attendance of those who cannot safely continue their attendance." The above considerations ought not to be put aside in considering the effect of three-story buildings upon the health of the young. But whatever may be said about the injury of overmuch stair-climbing, it cannot at least be denied that it is cruel and unnecessary. I have too many times stood at the head of the second flight of stairs and have seen young ladies dragging themselves, flushed and breathless, to the last stair, where they were ready to fall with faintness and fatigue, not to bear earnest testimony on this head.

5. The arrangement of halls, clothes-rooms, teachers' rooms, closets, store-rooms, etc., cannot be entered upon without drawings and an amount of detail not proper for this occasion. If the health of teachers is of any importance, all these elements of construction should receive minute attention, and some of them are of extreme importance in their bearing upon the health and habits of the pupils.

6. Permit me also to put aside all reference to the great questions of warming and ventilation by a reference to able standard works on these subjects. Especially would I refer to Dr. Kedzie's judicious and humane paper on "*The Temperature of Living-Rooms,*" read before the last session of the Michigan Teachers' Association. I will set down a few points from manuscript notes, all, I believe, in essential agreement with the paper of Dr. Kedzie:

(*a.*) Pupils should be encouraged to say when the room is too cold or too warm for their comfort. A condition of discomfort is an unwholesome condition.

(*b.*) The system of heating and ventilation should form parts of one whole.

(*c.*) Use radiant heat if possible. As radiant heat accompanied by light (the most satisfactory form of heat) is practically impossible, the radiating surface should be made as large as possible. If the floors and walls of the room and the main masses of furniture could be warmed so as to keep the heat-exchanges in the right direction, there would be little complaint of cold, even when the air of the room is cooled by abundant ventilation. An open grate for coal forms an excellent supplement to the usual hot-air furnace.

Pure air must cost something, but it should be had in abundance. The ventilating-flues should be many times the usual size.

I would strongly advise double windows.

After the day's work is over, and between the A. M. and P. M. sessions, the school-room should be thoroughly aired. The matting and upholstery (of which there should be as little as possible) should be frequently exposed to wind and sunlight.

The necessity for superabundant ventilation arises in many schools from the habits of the children, as infrequent bathing, hanging clothing in cooking-rooms, etc. Children should be advised, delicately and kindly upon this subject.

7. The distribution of light in the school-room is a matter of great importance. My own preference is for windows in the rear of the room and about half way down the sides. This will give abundant light, which should be tempered by blinds or thick curtains, or both, as occasion demands. On this head *deficiency of light* is the main evil to be dreaded. The evil next in order of prominence is a *light from the front,* especially when glaring and unsteady,

flooding and blinding the eye without illuminating the object. Next in order comes a long train of evils, connected with the habits of the pupil, the kind of work, etc., etc. Among these a few are more or less under the control of the teacher; as, pure air, an upright posture, a proper position of the book, clear, bold type, uncalendered paper. During the past few years I have made, alone or with others, many observations upon the eyesight of considerable numbers of pupils. I have also made many miscellaneous observations upon cases that specially interested me. As a result of the observations, I feel quite certain that in the schools with which I am acquainted there is no steady increase of defective vision with increased time of attendance at school, such as is reported from the German and from some eastern schools. I say this with hesitation, as I know how liable one is to generalize from a few cases, and also how much care is needed for reliable observations. Still, my experience forces me to believe that the sight of our pupils improves after the age of fifteen, and that defective eyesight appears and disappears with certain periods of life, certain seasons of the year, certain prevailing epidemics, certain kinds of work, etc. In short, on this head it seems to me that we have abundant occasion for great care, but no cause for alarm.

EFFECT OF PUBLICITY.

The most unhygienic thing (if I may use the word) about a school is not the stairs, or the flues, or the windows, the out-buildings, or the heating-apparatus, but the school itself. By this I mean that the school has an organic life which acts powerfully and constantly upon all its members, and in some directions always acts unfavorably. This life is in some sort independent of the individuals who compose the school. A school is a school, quite *sui generis,* the world over and among all sorts and conditions of men. Education in a public school, indeed in any sort of school, must ever be a thing quite separate and distinct from private education. A boy is one thing, but a school-boy is quite another thing. This peculiar and organic school-life is manifested especially in the unwillingness of pupils to take the initiative, or even to act with teachers, in matters pertaining to the common good. But it is more fully manifested in a subdued and tacit opposition to teachers and school-authority, which is especially prominent in the larger, higher, and better schools. This feeling is not inconsistent with respect and love for teachers and pride in a school, but it brings it about surely that the opinion of the least cultivated member of a class will practically outweigh, upon many important questions, that of Dr. Arnold or President Woolsey, or the experienced head of a large school. A great school says quite distinctly to any one who enters it, "You will have a great many fine sentiments and opinions thrust upon you by your teachers here to which you will give so much attention as you like; but when you come to act, simply look around you and do as others do." Thus a school is a *guild* of the closest kind. When parents put their children in school they should know that they commit them to the care of a tyrant power for which the teachers are as little responsible as they are, or rather for which they, the teachers, and the community are alike responsible. It is true that the public sentiment of a school concerns itself with only a narrow range of questions, but within its sphere parents and teachers are as nothing before it. Few young persons have the hardihood even to seem to oppose it. This sentiment tones up and it tones down. It says to those below, "Come up;" to those above, "Come down to our level." There is not a school in the land where the best boys dare do their best, owing to this sentiment.

This is an important matter upon the educational side, but as a question of health it is still more important. I verily believe that the severest strain of school life is to be found just here. It is not an easy matter to work freely and naturally in the presence of others. Let a clergyman prepare a few sermons in a crowded railroad depot and see if this does not add to his labor. But what is the noise and the unsympathetic looks of individual men and women, compared with the intrusive presence of your own set, or class, or guild?

If you think I make too much of this, see what a mortal fright seizes the sturdiest school-boy when he fears that he has unwittingly offended against the school code. And if it is thought that the so-called bad boys of school are too bad, too rude and coarse to be affected by such a fine sentiment, let me reply that it is often found that they are only bad because of it. When the eyes of their classmates are not upon them they are manageable enough.

But it is upon sensitive and delicate natures that the oppression and burden of so public a life falls heaviest. I remember well a pupil of good mind and fair preliminary training who impressed me, almost as soon as I came to know her, as not doing justice to her native powers. Her work at home was fairly prepared, but her work in school was mechanical and as hollow as an egg-shell. At first I suspected an absorbing interest in something outside of school, but I found that I was wrong in this supposition. She was of a good family and of pleasing and even refined manners, but she had some mannerisms and peculiarities, such as a tilting of the head to one side, and a way of raising one shoulder and clasping her hands tightly in front of her when she walked or stood to recite. I was surprised to see that these mannerisms and peculiarities disappeared when she was by herself, and noticing her more closely, I was forced to believe that she was living in a state of tension from extreme sensitiveness to the opinions and presence of others, which was constant and overwhelming. I cannot describe the effect which this discovery produced upon me. Her self-control was so perfect that her manner came near seeming free and natural, while in truth during every moment of her school-life she was in an ecstacy of nervous dread. Have you ever seen a boy in the deep sleep of childhood, his face placid, his breathing slow and deep, so that shoulders and the upper part of the chest were almost motionless, while the diaphragm and waist-muscles were in active play? and have you seen the same boy when awake and powerfully stirred by some passion, as of anger? and have you noticed his hard and quick breath, the rapid rise and fall of his shoulders, while the diaphragm and waist-muscles were as tense as a drum-head and the whole being was braced for action? and has it occurred to you to ask how long a boy would live in such a state of nervous tension, or how open he was to instruction while in this condition? This condition fairly illustrates that of the young lady, only fear, or more properly dread, had taken the place of anger. And I only cite this case because it is a typical one. I repeat that just here is the main offense of the public schools against health and longevity. This slightly unnatural condition adds greatly to the hardship of school life. It is a strain that pupils should not be made to bear.

Is any sanitation possible in this case? Yes, palliation at least, by the application of a few principles.

1. Let the teacher be simple, quiet, and natural.
2. Let show exercises and everything in the nature of display cease.
3. Let the teacher address himself to the formation of a healthy school sen-

timent as an important part of his work. This can be done by cultivating individuality, freedom of approach and expression of opinion, by disintegrating mischievous cliques, and by bringing together the better elements of the school.

4. He should not be afraid of being accounted partial, but should discriminate between the weak and the strong, freely excusing from public duties, from rising to recite, etc., those whom he accounts physically unable to do so. Especially should he be prompt to note and report at home signs of nervous exhaustion, as failing memory, a desire to be near the fire, drowsiness or sleeplessness, dullness of eyes and appearance of exhaustion, complaint of pain or tenderness about the neck and shoulders, etc. In all such cases let him insist upon a remission of some duties or a cessation of attendance. If this is partiality let him be wisely partial every day.

5. Let him strive to reduce the number of school-hours by stimulating to enthusiastic work, never long continued. In many cases only a single study or a half day's work should be allowed. No course of study should stand in the way of this permission.

6. Let him think as much of his pupils as of his subjects of study.

7. Let him never allow the criticism of pupils by fellow pupils.

8. Finally, let him face fairly this matter of sanitary reform, resolved to conceal nothing and to extenuate nothing, and to see to it that so far as in him lies the race shall improve in strength and vigor by the influence of the schools and the effect of school-work.

The President invited discussion of the paper, but as no one responded, the President called for Dr. Kedzie's paper on some "Conditions of Inflammability."

CONDITIONS OF INFLAMMABILITY.

BY PROF. R. C. KEDZIE, M. D., OF THE AGRICULTURAL COLLEGE, LANSING, PRESIDENT OF THE MICHIGAN STATE BOARD OF HEALTH.

It is an old saying that "fire is a good servant but a hard master." While we accept this proverb as the embodiment of the general experience of men on this subject, yet we may not comprehend the full extent of the truth embodied in this familiar saying. There are many things essential to our comfort and well-being to which we have become so accustomed that we hardly think of them, till by some chance we are in danger of losing them when we realize

> How blessings brighten as they take their flight!

What would become of health, comfort, or even of civilization if we were deprived of the help of this hot-headed and quick-tempered servant, fire? The extraction of metals from their ores, and even the use of the metals we now have, would soon cease if we were deprived of the use of fire; food must be eaten raw, and a thousand evils would crowd into the place of blessings we now enjoy, and we should find changes taking place in most unexpected quarters. We can scarcely conceive of the degradation and savagery of a race who did not know the use of fire.

Two years ago the industry of this nation received a rude shock in the railroad strikes that swept like a wave of madness over our country, and we held our breath in dread and asked, What shall the end be? But, instead of railroad employés, suppose the chemical forces should strike for better positions, higher wages, or even for back pay! Suppose that Oxygen should complain that he is always set to do the dirtiest and most repulsive work, compelled to be the scavenger of all forms of life—with never a holiday—a penny of pay—not even a cheap vote of thanks—and should refuse to work any longer on such hard terms. Suppose that Carbon should say that he had been twitted too often of his black face; that we had despised him and turned up our aristocratic noses at his menial, but useful ways; that capitalists had combined to compel him to grind in the prison-house of toil, without reward, thanks, or even recognition—and he will strike for something better! How would we fare in the face of such a strike? Not alone would railroads and steamboats stop, but every arm of industry would wither in an hour, and all life would cease in the twinkling of an eye.

Sancho Panza, in a burst of gratitude, exclaimed, "Blessed be the man who invented sleep!" We make no inquiry for the man who "invented" fire; his name is lost in the darkness that antedates antiquity itself. History will never reveal his name, for the use of fire must have long preceded that degree of civilization which renders authentic history or even tradition possible. Mythology relates that Prometheus, out of pity for the wretched condition of mortals, stole this choicest possession of the immortals, and thus braved the fury of omnipotent Jove. The "stealing fire from heaven" may be a poetic form of stating the prosaic fact that he obtained fire from some tree struck by lightning, because the lightning darts from the region of the clouds, which was the heaven of mythology, and Jupiter himself is represented with his right hand grasping the thunderbolts.

In most processes of human industry it is the direct and immediate product which is valuable: thus, we melt together sand and alkaline substances to make glass; we boil together grease and alkalies to make soap. But in the use of fire the direct products are of almost no value; these are water, carbonic acid, and ashes. It is only the indirect products of combustion which we value, namely, *light and heat*. We thus transport sunlight into the darkness of night, the warmth of Summer into the frozen realm of Winter. Without this power the refinements of social pleasure which cluster around the domestic hearth and evening lamp would disappear.

Charles Lamb says, "Hail candlelight! Without disparagement to sun or moon, the kindliest luminary of the three. We love to read, talk, sit silent, eat, drink, sleep, by candlelight. They are everybody's sun and moon. This is our peculiar and household planet. Wanting it, what savage, unsocial nights must our ancestors have spent, wintering in caves and unillumined fastnesses! They must have lain about and grumbled at one another in the dark. What repartees could have passed, when you must have felt about for a smile, and handled a neighbor's cheek to be sure that he understood it? This accounts for the seriousness of the elder poetry. Jokes come in with candles."

I have said enough to show the value of fire as a servant: I now call your attention to the fact that he is "a hard master." When I speak of his tyranous behavior when once he gets the upper hand, you at once recall the cities of Portland, Chicago, Boston, and St. Johns, which were almost wiped out by the devouring flames. How many families have rushed forth from stately homes and looked back only to see their doorways filled with belching flames, just as our first parents beheld for the last time the gates of their paradise,

> With dreadful faces thronged, and *fiery* arms.

FIRE-PROOF BUILDINGS.

The waste of property and the danger to life caused by fire have led men to seek means by which they may control this insatiable destroyer. The timid and the prudent alike demand protection from so cruel a master.

Disastrous fires have led prudent men to demand a change in the style of our architecture which shall limit instead of directly feeding these wide-spread conflagrations. It has been the prevailing custom in this country to run up cheap, flimsy but showy buildings which are as inflammable as a tinder-box. The erection in crowded cities of mansard roofs by which the building is surmounted by a large mass of the most combustible material, has been sharply and justly criticised. They are altars of vanity to that cruel divinity Fashion, and in the hour of peril they are clothed with sacrificial flame where priest and suppliant alike must "pass through the fire" to this modern Moloch.

Men have sought and sought in vain, for buildings which shall be indestructible by fire. The troglodytes, or cave-dwellers, are the only people who have successfully solved this problem. "Fire-proof buildings" have been erected only to go down in wild ruin in some great conflagration. In the great fire of Chicago these "fire-proof" buildings were destroyed as certainly as the flimsiest structures of wood. In the intense heat of that fire, marble, stone, and brick crumbled before the flame, and iron melted like lead. Architects have abandoned all hope of erecting buildings which will withstand any great conflagration. But all great fires are small in their beginning. "Behold how great a matter a little fire kindleth" is the brief history of all our great conflagrations. If we can prevent the small fires we shall escape the big fires.

NATURE OF COMBUSTION.

Before proceeding further in this discussion, let us consider some of the fundamental facts in combustion. Ordinary combustion is the chemical combination of atmospheric oxygen with a combustible body, the attendant light and heat being the result of the transformation of the chemical force into other forms of energy. A combustible body is any substance which can enter into chemical combination with oxygen under the influence of heat. In order that chemical combination may take place between the combustible body and the supporter of combustion, the two must be in contact, and the more perfect the contact the more rapid the combustion, because the greater the number of points at which combination may take place at the same instant. If the contact is perfect throughout the whole mass, as when a combustible gas mixes with oxygen or air, the combustion is instantaneous through the whole mass, and we have an explosion; if the gases only mingle along a plane, we have a flame as in the gas-jet; if the combustible is a solid and not vaporizable by the heat of combustion, there is no flame, and the substance burns with a glow, as seen in burning charcoal and anthracite. But if a combustible solid is finely pulverized and suspended in the air in form of dust, it may burn with an explosion, as may be seen when lycopodium is blown over a flame. Thus by blowing some lycopodium over the lamp-flame you see a flash leap through the air wherever the lycopodium dust is suspended in the air. In this way the flour-mills of Minneapolis were exploded a few years ago; and we have frequent accounts of candy-factories and other places where combustible dust fills the air, being blown up with a veritable explosion. If we greatly increase the extent of surface of some combustible material we may have combustion taking place at ordinary temperatures, as is seen when a solution of phosphorus in bisulphide of carbon is evaporated on paper, the large surface of phosphorus producing sufficient contact with air to cause combustion. I pour this solution of phosphorus over the paper holding some chlorate of potash on its surface, and the paper bursts into flame when the solution has evaporated.

When we compact these combustible materials into a solid mass, we find them less combustible: lycopodium pressed into a solid cake has but moderate combustibility. The lycopodium or fine shavings when pressed into a compact cake burns only slowly. Shavings burn readily, but when compressed into a solid mass, they will not burn better than solid wood. Light and gauzy articles of clothing made of cotton or linen, on account of their combustible material and large surface contact with air, are very inflammable. You observe how these pieces of muslin and tarlatan burst into flame and consume rapidly when once they touch a flame. Fabrics of wool and silk may expose an equal amount of surface, but they contain so much nitrogen, an incombustible material, that they are less apt to burn.

Combustion is arrested in two ways:

1. *By reducing the temperature of the combustible body below the burning-point.* The most familiar illustration is the use of water in putting out fire. We cannot heat water above 212° F. in the open air—a temperature far below the burning-point of all ordinary combustibles. By pouring water upon a burning body its temperature is rapidly reduced below its burning-point, and the fire is thus extinguished. Substances lighter than water and whose boiling-point is below 212° F., may float, vaporize, and burn upon the surface of water, without being quenched or checked by it. We have a good example of this in the lighter products of petroleum. Where considerable quantities of such materials are burning, water may serve to spread the fire instead of putting it out.

Another example of extinguishing a flame by reducing its temperature is seen in blowing out a candle. If we blow a live coal we increase the energy of combustion by supplying more rapidly the requisite amount of oxygen to support its combustion; but if we blow a candle-flame in the same way, we put out the flame. Since the flame is seen to move with the blast, many persons suppose that the flame is extinguished because it is moved away from its point of support (the wick), just as a feather is blown away by a blast of air. But the real cause is the cooling influence of the blast of air on the flame, for I can blow a much stronger blast of hot air without extinguishing the flame. I blow a jet of cold air upon this candle-flame and readily extinguish the flame; I blow a jet of hot air upon the candle-wick and readily relight it. But I may bring the intensely hot blowpipe flame to bear upon a very combustible body without burning it provided it does not become heated. I blow the jet of hot air, which readily lighted the candle, upon a piece of paper pasted on the smooth face of this hammer, but the paper does not burn or even scorch. No substance need take fire if it will "keep cool."

2. *We may extinguish flame by preventing the access of free oxygen to the combustible body.* Organic bodies will char when strongly heated, but will not inflame when free oxygen is excluded. I wish to call your attention to this means of preventing or arresting flame. Water may serve this purpose where it floods the burning body and thus shuts off the air; but if the body floats on the water the air will not be excluded, and in such case we may use ammonia-

water, which forms an atmosphere deficient in oxygen by evaporation of ammonia; or we may set free an atmosphere of carbonic acid (as by Babcock's fire-extinguisher), or we may exclude the air by sand, and earth of any kind, or even smother the flame by a blanket. A handful of sulphur thrown into the fire will check or even extinguish the burning of a chimney by using up all the oxygen of the air in the chimney; a handful of salt checks the combustion, because the volatilized salt coats over the soot and prevents access of air.

One very important application of the principle of preventing combustion by excluding air is to coat the inflammable material with some substance which will exclude free oxygen. To apply and enforce this principle is the object of this paper.

Where very inflammable materials are in use whose burning would not only destroy property but imperil life, it becomes a matter of great importance to use such preventives, especially when they are inexpensive and do not injure in any way the materials to which they are applied. This is in a marked degree true of the very inflammable materials which form the apparel of women and children. Accidents from this cause are frequent and the results most shocking. A few years ago the Archduchess Sophia of Austria stepped on a match which ignited, setting fire to her clothes, and she burned to death in the midst of her terrified maids. But we need not cross the sea for examples of this kind; almost every week the newspapers give us the agonizing details of some deplorable accident of this kind, and women and children are the victims in nearly every instance.

Such accidents may be repeated any day in any home in this State. Yet we speak of them as accidents against which we are helpless and which should move our pity, rather than wrongs which we should prevent. As a contribution to this end I place before you the results of some investigations made by others, and some of my own.

APHLOGISTICS.

Gay-Lussac many years ago recommended the phosphate of ammonia as a substance which would render the most combustible fabrics practically uninflammable. Here is some gauze which has been steeped in a solution of this salt, and although it will char in the gas-flame it will not burn with flame, and a dress thus protected could not catch fire and roast its wearer; you cannot make it blaze, though held in the flame. But when this salt was dissolved in the gelatinized starch in stiffening clothes, it was found that the clothes would not iron smooth, and it was rejected accordingly. Woman will go to the stake with the cheerful zeal of a martyr, but no one need ask her to wear fabrics that will not iron smooth.

The tungstate of soda was recommended in 1860 by Versman and Oppenheim as a means of rendering cotton and linen goods uninflammable. Here is a piece of tarlatan which has been steeped in solution of tungstate of soda, and though completely dry you see it does not blaze when held in the flame. In In the laundry of Queen Victoria the starch sizing contains 20 per cent of tungstate of soda, and 3 per cent of phosphate of soda. The starched clothes iron smooth, and the salts do not injure the goods or harm the wearer in any way. Here is tarlatan treated in this way, which you see is not readily combustible. Yet the tungstate of soda has not come into general use, possibly because it is so seldom found in the shops.

The hyposulphite of soda I find to have marked power of preventing flame, but I do not think it will come into general use because acid perspiration would evolve sulphurretted hydrogen from this salt.

I also find that common borax has a singular power of preventing flame. Here are specimens of paper muslin and tarlatan which have been dipped in solution of borax and dried, and you see they will not inflame even when held directly in the gas-flame. The reason why borax prevents flame is that it melts and forms a glassy coating over the surface of the paper, muslin, etc., thus preventing that free access of air which is essential to flame. To show how complete is this shielding influence of borax, I saturate a paper treated with borax with benzine and set it on fire; the benzine burns fiercely, but the paper, though wrapped in flames, does not itself inflame.

This protective influence of borax may be increased by adding to the borax a little more than its own weight of boracic acid. If you will dissolve 3 ounces of borax and 4 ounces of boracic acid in a pint of boiling water, and wet any kind of cloth in this solution, you will find it incapable of burning with flame. If one part of this solution is added to 3 parts of water and this used to make the gelatinized starch for laundry purposes, the dress-materials treated with it will not be dangerously inflammable.

But the simplest and easiest way to make your cotton and linen clothes safe from taking fire is to dissolve a heaped teaspoonful of powdered borax in half a pint of starch-solution. I urge upon you the adoption of this preventive measure for the following reasons: 1. It does not injure the fabric in any, imparts no disagreeable odor, and interferes in no way with the subsequent washing of the goods. 2. It does not prevent the formation of a smooth and polished surface in the process of ironing. 3. Borax can be found in every village, and is within the reach of all. 4. It is a cheap salt, and its use for this purpose very simple.

When I consider how inflammable are the dress-materials of women and young children, and that the loose and flowing drapery, by exposing so large an amount of surface to the air, is most dangerously promotive of rapid combustion; when I reflect that in the household service woman has so much to do with fire, and remember how many annually perish by this horrible form of death, I am in earnest in urging so simple and cheap a method of avoiding this needless waste of life. The following are samples of newspaper items of almost daily occurrence, showing how often women and children are horribly and fatally burned:

MASON—SHOCKING ACCIDENT—A WOMAN BURNED TO DEATH.

MASON, February 4, 1880.—A shocking accident occurred in Dansville last evening. Mrs. A. D. Beardsley lay down upon the bed with her little child and suddenly awoke to find her clothing in flames. Frantically seizing a bed-quilt she ran out of the house, screaming for assistance. Help soon arrived and the flames were smothered and the unfortunate woman again conveyed into the house, where, after a night of agony, she died this morning. She leaves a husband and four children. [*Post and Tribune.*]

LAPEER—CHILD BURNED TO DEATH.

LAPEER, February 11, 1880.—On Saturday afternoon of last week a three-year-old daughter of William Roberts, of Deerfield township, Lapeer County, was burned to death. She was playing with paper at the stove.

A daughter of Harvey Chaplin, of the town of Rich, aged ten years, was burned to death on Monday morning. The parents were absent from the house a short time, and on returning found the child with her clothes burned off. Coming in contact with the stove is the supposed cause. She lived only a few hours after the accident.—[*Post and Tribune.*]

FIRE-PROOF COMPOSITION.

Various combinations of ammonia and borax have been recommended in Paris for rendering fabrics incombustible, and I insert three of these:

1. Applicable to all kinds of goods:

Sulphate of ammonia	8 parts	Borax	1.7 parts
Carbonate of ammonia	2½ parts	Starch	7 parts
Boracic acid	3 parts	Water	100 parts

Steep the fabrics till thoroughly soaked, dry, and iron out.

2. For theatrical scenery, wood-work, etc.:

Boracic acid	5 parts	Gelatin	1½ parts
Chloride of ammonium	15 parts	Size	50 parts
Powdered feldspar	5 parts	Water	100 parts

Add enough whiting to give body, and apply (hot) with brush like paint.

3. For paper, securities, etc.:

Sulphate of ammonia	8 parts	Borax	1.7 parts
Boracic acid	3 parts	Water	100 parts

Heat the solution to 122° F., immerse paper in this, spread it out to dry, and press it to restore the glaze. It is nearly incombustible.

PROTECTION OF BUILDINGS.

Not only are textile fabrics liable to burn, but houses, barns, and outbuildings are exposed to the same danger. There are many ways of diminishing this danger, but no means of entirely removing it. Wood can be made comparatively uninflammable by saturating it with many salts, such as alum, copperas, etc. But if such wood is exposed to the weather, the rain will dissolve out these salts to a certain extent and the protection is diminished. Our buildings contain so much pine that they are very inflammable, and a spark may commence a serious conflagration. If we can make our buildings secure against these apparently trifling causes of fire, we have done much to promote security from fire. The overturning of a kerosene lamp was the origin of the great Chicago fire; a fire-cracker laid the city of Portland in ashes, and similar trivial causes may produce like effects if the present combustibility of our buildings remains unchanged. Even if we cannot prevent fires, if we can retard the rapid spread of the flames, we greatly increase the chances of extinguishing the fire.

Wood can be made quite uninflammable by coating it with soluble glass or silicate of soda. This pine shingle which has been coated with solution of the soluble glass, I hold in this hot flame, but the wood does not burn with a blaze, but only chars. The cheapest way of rendering outbuildings, fences, etc., incombustible, is by *yellow-washing* them with common water-lime and skim-milk, prepared in the same way that white-wash is made, except that water-lime and skim-milk are used instead of lime and water; the addition of a half a pound of common salt to each gallon of yellow-wash will improve its quality and increase its power of resisting fire. Lime and casein, or curdy matter of milk, will combine after a time and form a very hard and indestructible mass. The coating formed by water-lime and milk has some of the properties of oil-paint in excluding water, but has a power which paint wants of resisting fire. It forms a hard and closely-adhered covering to wood, not liable to rub off like white-wash, and has a very agreeable stone-color instead of the ghastly white of white-wash. The wood covered with this yellow-wash can hardly be made to blaze. Here are shavings and shingles which have been coated with this yellow-wash, but I cannot make them blaze.

If our cheap outbuildings, fences, etc., were covered with this yellow-wash where we cannot afford paint, their appearance would be much improved, and many serious conflagrations might be prevented.

SPONTANEOUS COMBUSTION.

Buildings sometimes take fire by spontaneous combustion; a substance undergoing active oxidation may produce enough heat to take fire. This is especially true if the substance is porous, so as to expose a large surface, and it is a good non-conductor of heat; hay and grain when recently stored in the barn after harvest; dung-heaps, etc.; greasy rags, or clothes smeared with varnish, are very liable to spontaneous combustion.

ASHES.

Many buildings are fired by careless disposal of ashes. Ashes conduct heat very slowly, and hence they will keep coals alive for a long time. The too common practice of placing them in boxes or barrels, even after they seem to be cold, is unsafe. Ashes sometimes take fire again and become a bed of hot cinders, even weeks after they have been removed from the fire. The cause of this is not well understood, but may possibly be from oxidation of potassium by moisture. It is never safe to place ashes in or near any combustible material.

My closing advice is this: Use fire as your servant and make him keep his proper place; let him never become your master either in the present or in the hereafter.

Agricultural College, February 6, 1880.

After the reading of the paper some questions were asked; they were responded to by Prof. Kedzie. The Secretary then submitted a letter and some diagrams from Warren C. Weatherly, of Grand Rapids, Mich., on water-closets.

The following resolution was then presented by the Hon. Le Roy Parker, of Flint, and carried unanimously.

Resolved, That the thanks of this convention be tendered to Bishop Gillespie, its presiding officer; to Dr. Hazlewood, its Secretary, and to the other clergymen, physicians, and citizens of Grand Rapids, to whose earnest efforts and kindly attention is due the marked success which has attended this sanitary convention.

The following resolution, offered by Mr. Jno. K. Allen, of Lansing, was unanimously carried:

Resolved, That the best thanks of this convention are due to the press of Grand Rapids for placing the proceedings of this convention before the minds of thousands of persons who were unable to be present in person.

The President again repeated his question, "Why the law is not enforced concerning public buildings."

Mr. Fischer, of the "Eagle" newspaper, stated that the press had called attention to the law without result.

The President again called attention to the publications of the State Board of Health, followed by some closing remarks wherein he thanked the Board for holding the convention in this city, and bade them God speed in their good work. He would like to see the suppression of all drinking-places, attention paid to the growing social evil, in the direction of education, a large reading-room, and in a sanitary way the erection of cheap bathing-houses. Then when the Board held its next session in this city we could rise up to a man and say, "I am not sick."

Dr. Griswold moved that a vote of thanks be extended Dr. Henry B. Baker for the literature he has written on the subject of sanitation. The resolution was supported and adopted.

On motion of Dr. Jacokes, the convention adjourned.

UNSANITARY CONDITIONS

IN

PUBLIC SCHOOLS.

BEING A PART OF REPLIES TO A CIRCULAR FROM THE

STATE BOARD OF HEALTH,

—BY—

G. E. CORBIN, M. D.,

—OF—

St. Johns, Michigan.

UNSANITARY CONDITIONS IN THE PUBLIC SCHOOLS.

BEING A PART OF REPLIES TO A CIRCULAR (38,) FROM THE STATE BOARD OF HEALTH.

BY G. E. CORBIN, M. D., OF ST. JOHNS, MICH.

What is true of the condition of our public schools here, may be true concerning the condition of many schools throughout the State; therefore, I deem it my duty to record the following.

We have in this school district 712 children of legal school age. Besides these, there are about 30 foreign scholars in attendance, making upwards of 740 pupils to be provided for. For the accommodation of these pupils we have three school-buildings, embracing eight rooms for seating, and two recitation rooms. We employ ten teachers. In the aggregate these eight rooms contain 8,150 square feet of floor-surface, which, on the basis advocated by the State Board of Health of Michigan, should not be occupied by more than 326 pupils.

On the contrary, according to the official returns for January, 1880 (the last to which I have access), there were 511 in daily attendance. These figures show a very badly crowded condition of our school-rooms; but when we consider that the room appropriated to the high-school contains 1,500 square feet of floor-surface, and only from 25 to 40 pupils, the condition of the remaining rooms is seen to be still worse. More than this, the grading and districting have been such as to concentrate in some rooms *three pupils* on the space that should have been *appropriated to one only*. In a room appropriated to the use of primary pupils, containing only 750 square feet of floor space (12 feet high), 95 have been present for regular exercises at one time! During the month of May, 1875, the *average daily* attendance in this room was 83.44. For the last six or eight years the attendance in this room has been in the vicinity of *seventy*, excepting when sickness or severe weather prevented. On the first day of the school year in 1878 (Sept. 2), 73 pupils were present for enrollment in this room. On the first day of the present school year (in September, last), 66 were here enrolled. It will be observed that the numbers constantly concentrated here are more than twice what the healthful capacity of the room would be, if it were properly ventilated, which it is not. Here I desire to record some of

THE RESULTS OF THIS CONCENTRATION.

Numerous hale, ruddy little pupils of 5, 6, 7, and 8 years of age have entered here with much ambition for their first school instruction. As I have had one of my own children among them, and others to treat, I have watched the effect of their condition and surroundings, and know whereof I affirm. In this room, on a small scale, I have seen Darwin's theory of the "survival of the fittest" (physically) tested, and its correctness demonstrated. Year by year this room is constantly crowded far beyond its healthful capacity, notwithstanding the weaker ones are continually compelled to drop from the ranks and remain at home to recruit their exhausted energies. I have a little boy whose only school advantages during a period of *four years* were confined to this room. During this period he did not accomplish more than he could easily have done in *two years,* with suitable and healthful accommodations. Appreciating the vile condition of the atmosphere, I permitted him to remain only 1½ hours in the forenoon, and 1½ hours in the afternoon. Under such circumstances, even, there was never a time during the whole four years when he was able to attend steadily for more than two months in succession. At the expiration of this time, or less, he would become too ill to attend. From two to four weeks of unrestrained recreation and exercise in the open air would so recruit his strength and energies as to cause his return to school. *In every instance, for four years, he failed rapidly when confined for only three hours per day in the vile atmosphere of this room; and in every instance he improved rapidly when transferred from it to the open air.* The history of this child is substantially the history of many of his companions and school-mates It is a fact, I grant, that not all were injured to the same extent. Some are endowed with far greater powers of endurance and resistance than others. These bear up longer, and crowd out the weaker ones; but *all* are injured to a greater or less extent. At the close of last year my little boy completed the prescribed course in this room. In advancing him to the next department (his age and strength now permitting), I sent him a long way out of his own district, that he might have the advantage of a larger room containing fewer scholars. He entered a light, airy room, 12 feet high, containing 1,075 square feet of floor-space, and 50 pupils. Up to the present time, embracing fully two-thirds of the school-year, he has attended steadily. He has constantly improved in physical health, and has accomplished much more in his studies than ever before during the same length of time. This record would be far too incomplete were I to omit the

HISTORY OF THE TEACHERS.

The history of the teachers in charge of the room first described, is as follows: Six years ago Miss C., from Pontiac, took charge of this room. At that time she was large, well developed, well nourished, strong. In brief, she was as "perfect a picture of robust health" as I ever saw. She endured her first year's labors here very well. Her second year's labor in the room "told upon her" very perceptibly. During her third year, she lost much in weight, complained greatly of lassitude—general languor—and went home pale, thin, and haggard, in comparison with her former self.

The above history of Miss C. is almost precisely the history of Miss W., who has been discharging like duties in the same room for the last three years. She tells me that since she attained her growth she never weighed so little as at the present time. To my certain knowledge, she needs, and is daily taking tonics—bracing remedies—that she may keep upon her feet at all. In contrast with this, I desire to state that Miss Q., engaged in the service of this school district at the same time Miss C. did. For three years they sat at the same table, and occupied the same sitting-room and sleeping-apartment. Their evenings were almost invariably spent together, whether in their room, at a public entertainment, or elsewhere. In brief, their habits were as nearly alike as is possible. In stamina—in real powers of endurance, Miss C. had thé advantage. Each was assigned to a primary department. Each was active, ambitious, successful. Miss Q. is still at work in the same room where she has, without loss of time, given good satisfaction for the last six years. Her health, strength, energies, vitality, are apparently unimpaired. She has changed no more than is common with us all, in the same length of time. Why? I will state a few more facts, and my readers can all draw their own inference. The first year's services of these two young ladies in this school terminated with the school year in June, 1875.

Miss C. occupied a room with no possible facilities for ventilation, excepting through open doors and windows. Miss Q.'s room was tolerably well ventilated, being heated by a furnace in the basement, and possessing a heated shaft for the exit of foul air. Besides this large advantage, numbers also favored Miss Q.'s room. Had it been properly ventilated, Miss C.'s room, with 750 square feet of floor-space, would have healthfully accommodated 30 pupils only; whereas, the *average daily* attendance during the whole year, was 64. Miss Q.'s room being tolerably well ventilated, and containing 1,075 square feet of floor-space, afforded healthful accommodations for 43 pupils; and the *average daily* attendance for the whole year 1875, was only 45.

Here we have two rooms in comparison. The one presenting just about the conditions stipulated for by the State Board of Health of Michigan, and the other packed with more than double its justifiable capacity. The results of these conditions for a period of six years, have been briefly but accurately recorded. It is true that during six years, fluctuations in numbers, and other changes, have occurred; but in the main, the relative condition of these two rooms has not been materially altered. The average daily attendance in Miss Q.'s room has increased from year to year, and was 65 in January last. Though the gradual changes in Miss Q.'s room have been detrimental, the results in the two rooms have been extremely different.

Two of our ten teachers are employed as assistants—one for the high-school and one for the grammar-school. These teachers are assigned to recitation-rooms, where different classes go to recite. These recitation-rooms are exactly 10½ by 12 feet; so that if well ventilated, each would accommodate *five* persons only. These rooms, no larger than a *small* bed-room, have been thus used for 12 or 15 years. Some of the classes are so large that 25 or 30 persons at a time have been daily compressed into one of these rooms to recite. Under such circumstances, the only possible way to avoid suffocation is to keep constant communication with the outer atmosphere through open windows, whatever the season of the year—whatever the temperature. I have neither time, space, nor inclination to record all of the detrimental effects of this inexcusable condition, falling under my personal observation. I will briefly relate one which is well authenticated, though the *results* did not fall under my professional observation. During our school-year which terminated in June, 1876, Miss R., of Ypsilanti, as assistant in our "high-school," had charge of the classes reciting in one of these small rooms. Miss R. is now so deaf that she has been compelled to abandon the profession of teaching. Prof. F., of Michigan University, traces her deafness to the effects of chronic catarrhal inflammation. Miss R. traces the catarrh to exposures received in this room. Many are the pupils, who, though not deaf, are afflicted with troublesome catarrh contracted in these small rooms. Many times have the facts been clearly set before the voters in this school district, in years past, without obtaining the relief sought, which the pupils and teachers so much need. The masses of people seem to have no conception of the extent of nervous prostration, enfeebled constitutions, and actual disease engendered by, and directly traceable to the vitiated atmosphere of overcrowded school-rooms. The effects are so gradual, so insidious, that they escape the attention, for a time at least, of careless and casual observers. Even when the effects have become painfully obvious, most parents are unable to trace them to their true origin. To them, the cause and effect are so remote, that they fail to see the connection. In this case, here at home, I can excuse their apathy on no other basis of explanation.

Just at this time there is a fair prospect that we are to have additional school-room. The voters are already harmoniously moving in the matter; but even yet, they do not seem to fully comprehend the needs—the necessities of the case. This appears from the fact that the room contemplated will scarcely supply the needs of those who are at present crowded out of the buildings entirely; so that I do not anticipate much, if any benefit, to the individual members now in attendance.

It is unpleasant to make these statements; nevertheless, I have made them from a sense of duty. I most sincerely hope and trust they may be the means of benefiting other children in other localities,—children yet unborn. If so, 'tis well. It is only the part of wisdom to profit by experience. Though the experience of *others* is not as generally heeded, it is, perhaps, none the less valuable.

G. E. CORBIN, M. D.

St. Johns, Mich., March 15, 1880.

THE CAUSATION OF
INTERMITTENT FEVER;

INCLUDING

A RECORD OF 118 CASES OF INTERMITTENT FEVER AND OF COINCIDENT METEOROLOGICAL AND OTHER CONDITIONS.

By A. W. NICHOLSON, M. D.,

OF

OTISVILLE, GENESEE CO., MICHIGAN.

CAUSATION OF INTERMITTENT FEVER.

HOW METEOROLOGICAL CONDITIONS MAY CAUSE SICKNESS; AND METEOROLOGICAL AND OTHER CONDITIONS INFLUENCING THE PRODUCTION OF INTERMITTENT FEVER.

BY A. W. NICHOLSON, M. D., OF OTISVILLE, MICH.

All investigators after scientific truths, and especially those working in the field of pathological research, must entertain respect for the recent systematic efforts of Prof. Klebs, and of Dr. Tommasi-Crudeti to discover the nature of the causation of periodic fevers in certain organisms existing in the soil, and in the atmosphere above the ill-famed Roman Campagna and Pontine Marshes. Yet the wavering conclusions arrived at by these earnest workers as a sequence of their labors, and the absence of positive knowledge as to the nature of the *causa sine qua non* of the development of the so-called malarial disorders, still leaves open the opportunity for further earnest work in this direction, further labor for the microscopist, and further labor upon the part of those other investigators who doubt the constant presence of a definite organism in the soil, to propagate and diffuse itself in the atmosphere, where that alone would be sufficient to produce the phenomena of periodic fever.

The sanitarian is still unable to point out, and adopt determinate means to exorcise this *ignis fatuus* and thereby offer a blessing to the State and to mankind, though great are the results consummated by him in the removal of *many* conditions that often appear to perform the parts of elements of causation.

Whatever channel of research the etiologist or pathologist may pursue, his exertions ought to be influenced by a thorough knowledge of all those common circumstances liable to cause a disturbance of a physiological state. He should not ignore the apparent relations that alterations in atmospheric pressure, that hygrometric changes, that temperature, and other meteorological conditions bear to these disturbances. The existence of the phenomena of fever needs not always be accounted for through a co-existence of a specific poison. Nor has the periodicity of fevers been explained by the presence of a "*bacillus malariæ.*"

I would not wish to offer any theory of my own to supplant the theories that have arisen as results of the admirable speculations of the many who have tried to fathom the nature of the cause of these fevers; but several years' observations of these fevers, with an effort to be systematic in a careful analysis of individual cases, as to their relations to immediate meteorological conditions and sanitary surroundings, may justify me in presenting the results of these observations.

The study of the relation of meteorology to pathology is every day assuming greater importance. That there are some factors that meteorology already has demonstrated bear a truthful relation of cause and effect in regard to sickness, does not justify one in anticipating that to atmospheric changes may sometime be traced the causation of all diseases. Yet we cannot but conceive that the conditions of the air exert an influence on all sicknesses and all physiological conditions.

The prevalence of periodic fevers in this region, especially during the Summer months, induced me to prepare a schedule of inquiries bearing upon the subjects of sanitation and meteorology in their relations to these fevers. I therefore commenced a history of these cases, as they occurred in my practice, on the 1st day of May, 1877, and according to the requirements of the schedule. At this date I did not have a complete meteorological equipment, but one including ozonometry. Upon the 18th of the succeeding month my apparatus accorded with the requirements adopted by the State Board of Health. The plan was to ascertain the date of attack, and consider each case in its relation to every meteorological fact possible pertaining to the forty-eight hours preceding the attack, and for the day of the attack. Also to secure facts relating to sanitary surroundings, to the health of the individual immediately preceding his present sickness, and facts relating to all exposures, excesses, and deprivations. Such a record, when tabulated, might enable me to arrive at some valuable conclusions.

In examining the facts recorded in the table one is impressed with the apparent relation of causation some of these facts bear to the individual cases.

Temperature, moisture, barometric pressure, and other atmospheric conditions assist in sustaining or occasioning perturbations in the physiological equilibrium of every individual. Yet, each state of the air never can exhibit its own influence separable from the combined influence of other atmospheric conditions, and our study of their relations to organic life should be governed by a knowledge of this fact. If humidity modifies the effects of temperature it also modifies the influence of barometric pressure, and of the wind. In speaking of the separate effects of temperature, the late Geo. B. Wood says:—

> "The effect of heat is to excite its own peculiar sensation in the seat of application. In a moderate degree this may not be displeasing; indeed, when the temperature has been depressed below the normal standard, it is often highly grateful; but, if increased it begins at length to become painful, and in the highest degrees is often extremely so.
>
> "The secretions are promoted, all of them probably at first, under a gentle operation of the stimulant; but when the heat is considerable and continued, the mucous membranes and the kidneys appear to be irritated beyond the point of free secretion, as indicated by a dryish state of the mouth and diminished discharge of urine; while the secretory function of the liver and skin are augmented so that there is usually a freer flow of bile and a greater or less increase of perspiration.
>
> "Along with the exaltation of the organic functions the nervous also becomes excited. A moderate influence of the cause is usually attended with agreeable effects. But these functions under a higher degree of excitation become deranged, and at a still higher are impaired. This result is simply in conformity with the general law that, by moderate over-excitation or irritation, the functions are increased in a normal direction, by a greater amount of it are deranged, and by a still greater are diminished or suppressed."

In a recent work on "Sanitary Examination of Water, Air, and Food," by Cornelius B. Fox, he writes of moisture:—

> "An excess of aqueous vapor in the atmosphere has not only a depressing effect on the nervous system, but it interferes with the cutaneous and pulmonary exhalations. If the temperature is high (65° to 80° Fahr.), saturated air is sultry and offensive; if low (*e. g.*, a Scotch mist of 36° Fahr.), its chilling influence penetrates all clothing. Above 80° Fahr. air of excessive humidity becomes injurious, and it has been doubted as to whether life can be prolonged in such air at a temperature of between 90° and 100° Fahr."

The practical researches of Dr. Bowditch, and of Dr. Baker of our own

State Board of Health, clearly demonstrate a marked relation between moisture and temperature and pulmonary affections.

The 19th of July of the year 1878 may well be remembered by the working population in this State, and especially by those at that time living in this vicinity. The morning opened with a temperature of nearly 70° Fahr. and the atmosphere saturated with humidity. At 2 o'clock P. M. the thermometer read 93° in the shade with a relative humidity amounting to eighty-five per cent. The highest temperature amounted to 96.5° Fahr. in the shade. The air was quiet, or moving at the rate of from two to four miles per hour. The record of atmospheric pressure was one of the highest during the month. The per cent of clouds was not sufficient to protect the laborer from the torrid heat of the sun. In the test for ozone for the preceding night there was but a trace, though this circumstance might have been due to decolorization by excess of moisture. The rate of ozone was, during the day, a discoloration of three degrees, on a scale of ten, according to Schönbein's test.

The great majority of the laborers working in the harvest-field during the most oppressive portion of the day, wisely, or instinctively, left the field, while among those who injudicously disregarded the warning the oppressive air gave to all, some were seized with sudden and excessive nausea and depression, others with vertigo, and many by attacks of typical periodic fevers whose paroxysms were repeated for several days. In two instances of insolation (sunstroke) occurring among those cases coming under my own observation, a lingering illness was followed by insanity terminating in death.

What was the cause of these differing disturbances when all were subjected to selfsame atmospheric conditions? While in the same field one was the prey of abdominal spasms with fluxes and nausea, another of ague, and another the victim of a coup-de-soleil (sunstroke), can we, when we know of the varying susceptibility of the nervous system of differing individuals to the influences of external impressions, and the ease with which discomfort overbalances a physiological condition, expect to discover the presence of one individual, septic, or cryptogamic element that alone will produce one of these sicknesses while the others are produced by known, obtaining atmospheric states, all being subservient to the same apparent causes?

It is difficult to declare what influence each meteorological element exerted upon those placed in relation to it. The most marked, probably, was the combined influence of temperature and moisture. Evaporation of the perspiration from the skin was almost absolutely prevented, and it was rendered impossible for the body to sustain the temperature of health. Disturbances in the digestive and circulatory and other functions were the result.

Another illustration of the apparent effects of elevated temperature and excess of moisture, came under my observation in the Summer of the year 1876. The locality was in a pioneer settlement and adjoining a pine forest. The floor of the house where the subjects resided was constructed of rough boards which were movable. The rooms of the house were practically as one. Beneath the house was stagnant water to the depth of two feet. A hot fire in a large stove was a frequent necessity, and the artificially heated atmosphere greatly served to attract the moisture from below. This humid air, subject to sudden fluctuations of temperature, was the apparent cause of the extreme sickness that followed. One of the inmates of this habitation died of colliquative diarrhea, and four others, after removal, slowly recovered from fevers of a periodic and a typhus type.

Experiments made with the psychrometer by the writer since the occurrence of the instance recorded last, demonstrate that where conditions exist to freely admit moisture where the air is artificially heated, as with stove above mentioned, there is excess of moisture in the air thus heated over that in the air not immediately subjected to such heat. Experiments conducted over a swamp with the view of ascertaining the varying amount of moisture in different situations, discovered that where there was free circulation of the air or a rapid motion the temperature and moisture were less than in situations where the air was more confined and the temperature higher.

The influence of barometric pressure on the phenomena of life is not yet well known. It is stated that a man of ordinary stature, subjected to a normal pressure of fourteen tons, suffers no great inconvenience, as the body, being permeable to the atmosphere, is subjected to equal pressure in all directions. Yet, the aeronaut, as he ascends into rarer atmosphere, experiences hemorrhages from nose, lips, and eyes, a fact ascribable to the absence of the customary atmospheric pressure exerted upon the blood-vessels. Although the change is sudden in these instances producing these effects, it is not improbable that the barometric fluctuations in the lower stratum of the atmosphere when associated with other favorable conditions, effect changes in the circulatory system and in the nervous system, that may excite discomfort and disease. What the *exact* relations may be between the weight of the atmosphere and co-inciding sickness, only multiplied observations in this direction can demonstrate. Other co-existing factors must be considered at the same time. Strict accuracy in this relation requires that the observer should not wholly rely upon averages of months in regions isolated from the case of sickness, but that he should make the time of his observation correspond simultaneously with the date of attack, and that the observations should be in close proximity to the location of the case. The same accuracy should be observed in respect to every other meteorological condition when studied in relation to prevailing disease.

The effects of the prevalence of clear or cloudy skies as factors in the prevention or production of disease is little studied and, perhaps, too greatly disregarded. It is generally believed that sunshine is conducive to the perpetuity of a healthy state of the body and mind. Although this proposition is generally true, an exception often occurs when, after rains, the effects of high temperature and a humid air are ameliorated by an over-clouded sky. The invigorating influence of showers, increasing, as it usually does. the quantity of active oxygen, and washing impurities from the air, more than equals the evil a cloudy sky would cause.

If ozone is the "scavenger" of the atmosphere, it has an ally in the wind that dilutes the air containing local impurities with fresh supplements of purer air, thus enabling this great disinfectant to better seize upon its poisonous particles. Although the wind often is the agent that transports the contagia of virulent disease, it often acts as a factor to prevent disease. High temperature and extreme humidity of the air, with a still circulation, prevent cutaneous and pulmonary exhalations to such an extent as to occasion diarrhea and other disorders, especially those apt to occur where nervous depression already obtains. A change happens when a breeze puts into circulation the motionless air. Then the surface of the body experiences cooler and more agreeable sensations by an augmented evaporation from the skin, and its salutary influence is reflected to the nerve-centers.

How great may be the influence of active oxygen upon the animal economy is, also, yet a question for extensive observation and speculations. Notwithstanding so little positive information has been obtained relating to its agency in preventing or producing disease since its discovery in 1839 by Prof. Schönbein, and so discouraging have been the results arrived at by most observers, the present unabating enthusiasm exhibited by many investigators in relation to this subject renders an eventual solution of the problem probable.

The State Board of Health of Michigan considered the subject worthy of study, and has adopted a systematic course of investigation in regard to it. In a communication to the writer, the Secretary of the Board emphasized the importance he placed upon the study of the etiological relations of ozone.

The following table exhibits the monthly averages of the principal meteorological data. It is inserted to assist in the study of the cases recorded in the table succeeding it.

MONTHS, 1877.	Temp. Degrees F.*	Grains of Vapor in Cubic Foot of Air.*	Atmospheric Pressure. Inches.*	Velocity of Wind. Miles per Hour.* †	OZONE.		Rainfall. Inches.	Per Cent of Cloudiness.*
					Day. 7 A. M. to 2 P. M.	Night. 9 P. M. to 7 A. M.		
May	57.8	----	------	4.4	3.5	2.7	1.75	33.6
June	67.0	5.62	29.068	6.5	3.0	2.7	3.77	37.5
July	72.5	6.03	29.084	3.5	3.0	1.9	1.97	32.1
August	69.9	5.99	29.066	2.2	3.4	1.8	3.58	32.9
September	62.5	5.56	29.153	2.7	3.1	1.9	2.59	24.7
October	50.7	5.11	29.114	2.9	3.4	3.2	4.33	80.1
November	33.9	2.53	29.143	3.9	4.6	5.2	3.03	65.0
December	36.0	2.60	29.221	6.0	3.4	3.9	1.63	68.0

* Average of observations, at 7 A. M., 2 P. M., and 9 P. M. daily.
† Estimated.

The altitude of the place where these observations were taken is 820 feet above the level of the sea; the latitude, 43°13′, and longitude, 83°31′. Topographically the country consists of level tracts succeeded by sandy elevations, and abounds in small lakes. The soil varies greatly in short distances, consisting of clay, clay loam, sand and sandy loam.

TABLE.—*Record of 118 Cases of Intermittent Fever*

Case.	Date of Attack.	Date of first Visit.	Date of Meteorological Observation.	Temp. 7 A. M.	Temp. 2 P. M.	Temp. 9 P. M.	Grains of vapor in a cubic foot of air. 7 A. M.	Grains of vapor 2 P. M.	Grains of vapor 9 P. M.	Barometric Pressure. Reduced to 32° F. 7 A. M.	Barometric 2 P. M.	Barometric 9 P. M.	Barometric Mean.	Per Cent of Cloudiness. 7 A. M.	Cloudiness 2 P. M.	Cloudiness 9 P. M.	Prevailing Direction and Velocity of Wind. Direction.	Miles per Hour. *	Ozone, Night, 9 P. M. to 7 A. M.
1	1877 May 2	May 5	May 1	31	40	37	-----	-----	-----	-----	-----	-----	-----	100	100	100	N. W.	4-2	----
			" 2	30	49	41	-----	-----	-----	-----	-----	-----	-----	00	5	00	N. W.	4-2	----
2	1	5	----------	--	--	--	-----	-----	-----	-----	-----	-----	-----	----	----	----	----------	------	----
			May 1	31	40	37	-----	-----	-----	-----	-----	-----	-----	100	100	100	N. W.	4-2	----
			----------	--	--	--	-----	-----	-----	-----	-----	-----	-----	----	----	----	----------	------	----
3	7	7	" 5	46	60	47	-----	-----	-----	-----	-----	-----	-----	20	75	5	E.	4	----
			" 6	49	60	48	-----	-----	-----	-----	-----	-----	-----	00	Smo	00	N. E.	12-4	4
			" 7	47	61	47	-----	-----	-----	-----	-----	-----	-----	75	50	00	N. E.	12-4	4
4	12	13	" 10	45	51	47	-----	-----	-----	-----	-----	-----	-----	90	90	90	N. & E.	2-4	2
			" 11	57	62	44	-----	-----	-----	-----	-----	-----	-----	90	90	00	S. E. & N. E.	2	3
			" 12	50	67	52	-----	-----	-----	-----	-----	-----	-----	00	25	00	N. E. & S. E.	4-2	3
5	18	20	" 16	69	72	60	-----	-----	-----	-----	-----	-----	-----	50	20	00	S. E. & S. W.	2-12	2
			" 17	62	72	69	-----	-----	-----	-----	-----	-----	-----	100	75	00	S. E. & S. W.	2-4	1
			" 18	69	82	70	-----	-----	-----	-----	-----	-----	-----	50	50	5	S. W.	4-2	2
6	18	20	" 16	69	72	60	-----	-----	-----	-----	-----	-----	-----	50	20	00	S. E. & S. W.	2-12	2
			" 17	62	72	69	-----	-----	-----	-----	-----	-----	-----	100	75	00	S. E. & S. W.	2-4	1
			" 18	69	82	70	-----	-----	-----	-----	-----	-----	-----	50	50	5	S. W.	4-2	2
7	19	21	" 17	62	72	69	-----	-----	-----	-----	-----	-----	-----	100	75	00	S. E. & S. W.	2-4	1
			" 18	69	82	70	-----	-----	-----	-----	-----	-----	-----	50	50	5	S. W.	4-2	2
			" 19	69	88	67	-----	-----	-----	-----	-----	-----	-----	50	25	10	S. W.	12-2	
8	17	21	" 15	50	72	59	-----	-----	-----	-----	-----	-----	-----	100	75	5	E.	4-2	3
			" 16	69	72	60	-----	-----	-----	-----	-----	-----	-----	50	20	00	S. E. & S. W.	12-2	2
			" 17	62	72	69	-----	-----	-----	-----	-----	-----	-----	100	75	00	S. E. & S. W.	2-4	1
9	11	21	" 9	46	50	43	-----	-----	-----	-----	-----	-----	-----	75	75	10	N. W. & N.	4-2	3
			" 10	45	57	47	-----	-----	-----	-----	-----	-----	-----	90	90	90	N. & E.	2-4	2
			" 11	57	62	44	-----	-----	-----	-----	-----	-----	-----	90	90	00	S. E. & N. E.	2	3
10	20	21	" 18	69	82	70	-----	-----	-----	-----	-----	-----	-----	50	50	5	S. W.	4-2	2
			" 19	69	88	67	-----	-----	-----	-----	-----	-----	-----	50	25	·10	S. W.	12-2	1
			" 20	72	88	72	-----	-----	-----	-----	-----	-----	-----	50	50	100	S. E. & E.	2-4	1
11	3	29	" 1	31	40	37	-----	-----	-----	-----	-----	-----	-----	100	100	100	N. W.	4-2	----
			" 2	30	49	41	-----	-----	-----	-----	-----	-----	-----	00	00	00	N. W.	4-2	----
			" 3	39	57	47	-----	-----	-----	-----	-----	-----	-----	00	10	5	S. W. & N. W.	2-4	----
12	20	J'ne 1	" 18	69	82	70	-----	-----	-----	-----	-----	-----	-----	50	50	5	S. W.	4-2	2
			" 19	69	88	67	-----	-----	-----	-----	-----	-----	-----	50	50	10	S. W.	12-2	1
			" 20	72	88	72	-----	-----	-----	-----	-----	-----	-----	50	50	100	S. E. & E.	2-4	1
13	J'ne 1	4	" 30	66	80	63	-----	-----	-----	-----	-----	-----	-----	25	25	00	S. W.	4-2	3
			" 31	71	81	67	-----	-----	-----	-----	-----	-----	-----	10	5	10	S. W. & S.	12-4	3
			June 1	72	83	69	-----	-----	-----	-----	-----	-----	-----	5	75	5	S. E.	12-4	3
14	2	4	May 31	71	81	67	-----	-----	-----	-----	-----	-----	-----	10	5	10	S. W. & S.	12-4	3
			June 1	72	83	69	-----	-----	-----	-----	-----	-----	-----	5	75	5	S. E.	12-4	3
			" 2	69	80	61	-----	-----	-----	-----	-----	-----	-----	00	00	5	N. W. & S. W.	12-4	4
15	4	10	" 2	69	80	61	-----	-----	-----	-----	-----	-----	-----	00	00	5	N. W. & S. W.	12-4	4
			" 3	69	80	61	-----	-----	-----	-----	-----	-----	-----	75	10	10	N. W. & W.	25-2	3
			" 4	69	75	59	-----	-----	-----	-----	-----	-----	-----	5	25	haze	W. & E.	4	3
16	11	11	" 9	69	67	58	-----	-----	-----	-----	-----	-----	-----	100	100	100	S. W. & N. W.	12-4	4
			" 10	50	58	50	-----	-----	-----	-----	-----	-----	-----	100	75	10	W.	12-2	3
			" 11	53	59	52	-----	-----	-----	-----	-----	-----	-----	10	95	75	E. S. W.	12-2	4
17	7	14	" 5	55	71	59	-----	-----	-----	-----	-----	-----	-----	100	95	100	N. E.	4	4
			" 6	59	74	61	-----	-----	-----	-----	-----	-----	-----	10	haze	00	N. E.	4-2	1
			" 7	64	79	65	-----	-----	-----	-----	-----	-----	-----	5	25	00	N. E. & S. E.	2-12	2

* Estimated, by observations at 7 A. M., 2 P. M., and 9 P. M. The figures separated by hyphens denote the greatest and the least velocity; in some cases the velocity is given for the three observations, thus, 2-12-4.

and Coincident Meteorological and other Conditions.

Ozone, Day, 7 A. M. to 2 P. M.	Rainfall, Inches.	Character of Surrounding Country, and Nature of Soil.	Sanitary Surroundings of Habitation.	Age, in Years.	Sex and Social Condition.*	Recent Exposures, Excesses, and Deprivations.	Type of Disorder.
---- ----	Light Snow. ------	Village. Low lands partly drained. Forests ½ mile distant. Soil sandy.	House in village, low on ground. Ground cold and wet at this time. Well 27 ft. deep; iron pipe. Water becomes yellow on standing; has bad taste.	27	Fe. M.	Patient says cause of her sickness might be due to her having taken off underclothing.	Tertian.
---- ---- ----	Light Snow.	Level well cultivated farming country. Soil clay and sandy loam.	Ground cold and wet on May 1. Sanitary surroundings fair. Well-water good.	23	Ma. M.	Only such exposures as working hard in field would occasion.	Tertian.
1 4 4	------ ------ ------	Level and well cultivat'd. Soil sand, clay and loam. Soil dry at this time.	House low on ground. No cellar. Good water.	33	Ma. M.	Deprived of rest by taking care of sick wife.	Tertian.
4 3 3	------ ------ ------	Land rolling. Ponds and marshes near. Soil mixed and dry.	House, rough boards. No cellar. Stagnant pond near. House in settlement with population of 75. No other case near. Water good.	10	Ma.	Has a very impressionable nervous system and is subject to convulsions; no apparent unusual cause why sickness should occur.	Quotidian.
3 3 2	------ .77 ------	Slight elevations surrounded by swamps. Elevations sandy.	Low, filthy, unfinished house. Well-water good.	77	Fe. M.	No unusual exposures, etc....	Tertian.
3 3 2	.08 .77 ------	Elevated farm'g country. Small lake 100 rods from house. Soil sandy.	Low, small house; no cellar. Water good. Soil wet from rain of previous day.	1 & ½	Ma.	No unusual exposures, etc., excepting the air was nearly saturated with moisture.	Quotidian.
3 2 2	.77 ------ ------	Same as in case 1........	Same as in case 1...............	3	Ma.	Went bare footed on the 17th and 18th, for first time this year.	Quotidian.
4 3 3	.46 .08 .77	Soil sandy. Woods. Low lands and swamps near.	Low board house; ground wet. No cellar under house. Spring-water; Some organic matter in it.	1	Fe.	Went bare-footed on 17th, and had then first marked chill.	Tertian.
4 4 3	.01 ------ ------	Woods. Low lands and swamp lands. Soil sandy.	Low log house. Use spring-water containing organic matter. Bad taste to water.	1 & ½	Ma	Child's health affected by period of dentition.	Tertian.
2 2 3	------ ------ .24	In village of Otisville. Soil sandy. Land rolling.	Small house with no cellar. Well 15 feet deep, containing surface water.	39	Ma.	Occupation, blacksmithing. Left shop and went fishing, remaining out until 2 A. M. of 19th.	Tertian.
---- ---- ----	Light Snow.	Land rolling. Swamp and low land 40 rods from house. Soil sandy.	House low and uncleanly; no cellar. Well 44 ft. deep; metallic taste. Ground moist.	43	Fe. M.	Been working unusually hard and exposed to all kinds of weather up to date of first visit.	Tertian, Quotidian, Double Quoti'dn
2 2 3	------ ------ .24	Open rolling farm'g country. Low swamp land 40 rds. frm house. Sandy loam.	House in good condition; rather low. Water good.	11	Fe.	No unusual exposures.......	Tertian.
3 3 3	------ ------ ------	Country level. Soil sandy and sandy loam.	Log house completely inclosed with trees and shrubs. Great amount of moisture about house. Well-water good.	30	Fe. M.	Much worn from caring for sick in her own house.	Quotidian.
3 3 4	----- ------ ------	Rolling farming country. Soil sandy.	Cellar damp. Much decaying vegetable debris about house. Well-water good.	70	Ma. M	Childish, and subjects himself to all kinds of exposures without reason.	Tertian.
4 4 4	------ .10 ------	Rolling farm'g lands. Soil clay and clay loam.	Good house, but 2 ft. of water in the cellar. Been water in the cellar for 2 months. Well water good.	40	Fe. M.	No unusual exposures, etc....	Tertian.
3 3 4	.89 ------ .11	Same as in case 10.......	Ground wet. Very wet unfinished cellar. Well-water good.	32	Fe. M.	No unusual exposures, etc....	Tertian.
4 3 3	.11 ------ ------	Same as in case 10.......	Ground damp. House low on ground; no cellar; bad air. Water not good; used continually.	10	Ma.	No unusual exposures, etc. ..	Tertian.

* Ma.—Male. Fe.—Female. M.—Married.

TABLE.—CONTINUED.—*Cases of Intermittent*

CASE.	Date of Attack.	Date of first Visit.	Date of Meteorological Observation.	TEMP.			GRAINS OF VAPOR IN A CUBIC FOOT OF AIR.			BAROMETRIC PRESSURE. REDUCED TO 32° F.				PER CENT OF CLOUDINESS.			PREVAILING DIRECTION AND VELOCITY OF WIND.		Ozone, Night, 9 P. M. to 7 A. M.
				7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P.M.	Mean.	7 A. M.	2 P. M.	9 P. M.	Direction.	Miles per Hour. *	
18	J'ne 16	J'ne 17	June 14.	60	76	69	-----	-----	-----	-----	-----	-----	-----	50	20	25	W. & S.	2-4	2
			" 15.	76	75	70	-----	-----	-----	-----	-----	-----	-----	25	100	10	S. W.	2-25-2	3
			" 16.	65	76	67	-----	-----	-----	-----	-----	-----	-----	100	20	10	S. W. & E.	4-2	1
19	15	17	" 13.	67	73	61	-----	-----	-----	-----	-----	-----	-----	50	75	25	S. & S. W.	12-4	3
			" 14.	60	76	69	-----	-----	-----	-----	-----	-----	-----	50	20	25	W. & S.	2-3	2
			" 15.	76	75	70	-----	-----	-----	-----	-----	-----	-----	25	100	10	S. W.	2-25-2	3
20	15	18	" 13.	67	73	61	-----	-----	-----	-----	-----	-----	-----	50	75	25	S. & S. W.	12-4	3
			" 14.	60	76	69	-----	-----	-----	-----	-----	-----	-----	50	20	25	S. W.	2-3	2
			" 15.	76	75	70	-----	-----	-----	-----	-----	-----	-----	25	100	10	S. & S. W.	2-25-2	3
21	1	19	May 30.	67	80	63	-----	-----	-----	-----	-----	-----	-----	25	25	00	S. W. & S.	4-2	3
			" 31.	71	81	67	-----	-----	-----	-----	-----	-----	-----	10	5	10	S. W. & S.	2-12-4	3
			June 1..	72	83	69	-----	-----	-----	-----	-----	-----	-----	5	75	5	S. E.	4-12-4	3
22	5	19	" 3..	69	75	61	-----	-----	-----	-----	-----	-----	-----	75	10	10	N. W. & W.	4-25-2	3
			" 4..	62	73	59	-----	-----	-----	-----	-----	-----	-----	5	25	haze	W. & E.	4.	3
			" 5..	55	71	59	-----	-----	-----	-----	-----	-----	-----	100	95	100	N. E.	4.	4
23	18	22	" 16.	65	76	67	-----	-----	-----	-----	-----	-----	-----	100	20	10	S. W. & E.	4-2	1
			" 17.	70	81	59	-----	-----	-----	-----	-----	-----	-----	00	10	10	E.	1-4	3
			" 18.	68	85	72	5.77	6.73	6.33	29.10	28.95	28.98	29.01	10	75	10	S. & S. W.	12.	3
24	23	24	" 21.	64	76	55	6.28	6.81	4.18	28.99	28.93	29 68	29.00	100	30	00	S. & W.	2-12	3
			" 22.	55	68	51	4 18	3.94	3.30	29.22	29.26	29.26	29.25	30	20	00	N. E.	12-4	2
			" 23.	52	77	57	3.23	4.50	1.05	29.25	29.20	29.00	29.15	00	20	00	S. W. & S.	2-4 2.	3
25	24	24	" 22.	55	68	51	4.18	3.94	3 30	29.22	29 26	29.26	29.25	30	20	00	N. E.	12-4	2
			" 23.	52	77	57	3.23	4.50	1.05	29.25	29.20	29 00	29.15	00	20	00	S. W. & S.	2-4-2	3
			" 24.	62	85	65	4.98	6.07	6.87	28.91	28.82	28.88	28.87	5	40	20	S. & S. W.	2-4-2	2
26	24	30	" 22.	55	68	51	4.18	3.94	3.30	29.22	29.26	29.26	29.25	30	20	00	N. E.	12-4	2
			" 23.	52	77	57	3.23	4.50	1 05	29.25	29.20	29.00	29.15	00	20	00	S. W. & S.	2-4-2	3
			" 24.	62	85	65	4.98	6.07	6.87	28.91	28.82	28.88	28.87	5	40	20	S. & S. W.	2-4-2	2
27	25	30	" 23.	52	77	57	3.25	4.50	1.05	29.25	29.20	29.00	29.15	00	20	00	S. W. & S.	2-4-2.	3
			" 24.	62	85	65	4.98	6.07	6.87	28.91	28.82	28.88	28.87	5	40	20	S. & S. W.	2-4-2	2
			" 25.	65	86	60	6.68	6.25	4.90	29.00	29.02	28.97	29.00	00	15	100	S. W. & S E.	2-12.	3
28	20	J'ly 4.	" 18.	68	85	72	5.77	6.73	6.33	29.10	28.95	28.98	29.01	10	75	10	S. & S. W.	12	3
			" 19.	67	76	53	5.30	5.08	3.58	29. 14	29.22	29.32	29.33	10	25	10	N. E. & N. W.	12-4	3
			" 20.	56	80	69	4.02	6.02	6.25	29.31	29.19	29.04	29.18	20	30	75	S. W.	4-12	2
29	25	10	" 23.	52	77	57	3.25	4.50	1.05	29.25	29.20	29.00	29.15	00	20	00	S. W. & S.	2-4-2	3
			" 24.	62	85	65	4.98	6.07	6.87	28.91	28.82	28.88	28.87	5	40	20	S. & S. W.	2-4-2	2
			" 25.	65	86	60	6.68	6.25	4.90	29.00	29.02	28.97	29.00	00	15	100	S. W. & S. E.	2-12.	3
30	J'ly 6.	8.	July 4..	62	84	65	5.27	6.55	6.07	29.28	29.22	29.19	29.23	15	50	10	S. E. & S. W.	2.	2
			" 5..	67	87	66	6.93	7.48	5.42	29.16	29 08	29.09	29.12	10	30	90	S. & N. W.	2-4	1
			" 6..	65	82	59	3.79	5.52	4.79	29.20	29.19	29.21	29.20	5	5	00	E. & N. E.	2.	3
31	10	15	" 8..	73	87	72	7.57	7 85	7.00	29.04	28 97	28.95	28.99	10	20	25	S. W.	4-2.	3
			" 9..	71	84	71	7.86	6.18	5.03	28.90	28.83	28.90	28.88	100	50	35	W. N. W.	2-4.	2
			" 10.	62	73	59	5.27	4.84	4.28	28.99	29.00	29.07	29.02	00	90	5	N. W.	2.	2
32	18	19	" 16.	75	88	68	6.62	8.50	5.47	28.95	28.87	28 97	28.93	100	50	90	S.	2-4	2
			" 17.	66	86	71	5.78	5.38	5.03	29.01	28.96	28.93	28.96	100	60	50	S. W.	2-4-2	3
			" 18.	68	83	63	6. 10	5.15	6.45	28.88	28.75	28.74	28.79	90	80	100	S. & E.	2-12-2	3
33	20	21	" 18.	68	83	63	6.10	5.15	6.45	28.88	28.75	28.74	28.79	90	80	100	S. & E.	2-12-2	3
			" 19.	61	69	60	5.40	5.37	4.95	28.78	28.80	28.87	28.81	50	50	75	W. & N. W.	2.	2
			" 20.	58	67	59	4.64	5.04	5.08	28.93	28.98	29.09	29.00	40	90	50	S.W. & N.W.	2.	2
34	21	27	" 19.	61	69	60	5.40	5.37	4.95	28.78	28 80	28.87	28.81	50	50	75	W. & N. W.	2.	2
			" 20.	58	67	59	4.64	5.04	5.08	28.93	28.98	29.09	29.00	40	90	50	S.W. & N W.	2	2
			" 21.	58	81	68	4.64	5.92	5.20	29.20	29.19	29.23	29.21	00	5	50	N. W.	1-4	1
35	25	27	" 23.	67	86	68	6.55	6.58	5.78	29.41	29.40	29.40	29.42	5	5	5	N. W. & E.	2.	2
			" 24.	77	89	67	6.71	5.35	5.60	29 42	29.29	29.24	29.32	5	10	5	E. & S.	2.	2
			" 25.	71	84	75	6.14	7.17	8 05	29.20	29.09	29.05	29.11	50	50	90	S. E.	1-4	2

* Explained in foot-note on page 198.

Fever and Coincident Conditions.

Ozone, Day, 7 A. M. to 2 P. M.	Rainfall, Inches.	Character of Surrounding Country, and Nature of Soil.	Sanitary Surroundings of Habitation.	Age, in Years.	Sex and Social Condition.*	Recent Exposures, Excesses, and Deprivations.	Type of Disorder.
3 2 3	------ .39 ------	Rolling farming country. Soil clay and clay loam.	Ground damp. Well-water good. Sanitary surroundings fair.	6	Fe.	Tonsilitis preceded attack a few days.	Tertian.
3 3 2	------ ------ .39	Level farming country. Soil sandy loam.	Log house; no collar. Well-water not good, but used by all continually.	22	Fe. M.	Been about, but troubled with diarrhea for two weeks.	Remittent.
3 3 2	------ ------ .39	Hilly farming land. Soil sandy loam.	Sanitary surroundings fair. Well-water good.	12	Ma.	Been ailing for some time. Chills appeared first on 15th.	Tertian.
3 3 3	------ ------ ------	Rolling farming country. Small stream near house. Sandy soil.	House poor and low on ground. Well contains mostly surface-water. Water used by whole family.	7	Fe.	No unusual exposures, etc.	Tertian.
4 4 4	.10 ------ .11	Same as 21	Same as 21	9	Ma.	No unusual exposures, etc.	Tertian.
3 2 3	------ ------ ------	Same as case 10	Same as case 10	16	Ma.	Had been living in another county until a few days preceding attack. Was well when he arrived here.	Tertian.
3 4 4	.12 ------ ------	Wild rolling land. Soil sandy. In forest.	House of rough boards built in opening in a forest. Coal pits near for making charcoal Water used mostly surface-water.	16	Fe.	Girl of dissolute habits. No known unusual exposure, etc.	Tertian.
4 4 3	------ ------ .56	Same as case 10	Low board house on border of small lake. Cleanliness disregarded. Water not good.	2	Fe.	Nothing unusual	Congestive chill.
4 4 3	------ ------ .56	Good rolling farm'g country. Soil sandy loam	House low on ground. Water generally good. Ground wet on day of attack.	2	Ma.	Nothing unusual	Tertian.
4 3 3	------ .56 .21	Same as case 26	Same as case 26	4	Ma.	Nothing unusual	Tertian.
3 3 4	------ ------ ------	Roll'g land near swamps. Soil sandy loam.	House a low log. Damp dug-out under house. Well-water, good.	3	Fe.	Nothing unusual	Tertian.
4 3 3	------ .56 .21	Same as case 10	House on low land. Water good.	4	Fe.	Nothing unusual	Tertian.
3 2 4	------ ------ ------	Same as case 10	House low on ground. Water in cellar. House surrounded with thickly standing trees and shrubs. Well-water good.	1 & ⅔	Fe.	Had diarrhea for 2 weeks previous to attack.	Tertian.
2 3 4	------ .02 ------	Level farming land. Soil sand and clay loam.	Old house low on ground. Well water not good.	14	Fe.	Been troubled with toothache for some time, and was sick from being up nights and from the pain from tooth.	Quotidian.
3 3 4	.10 ------ 1.19	Level farming lands. Soil clay loam.	Sanitary surroundings fair. Well-water good.	29	Fe. M.	Worked harder than usual, and has been reduced by Leucorrhea.	Remittent.
4 2 3	1.19 .05 ------	Good farming country.—Soil sandy loam.	Unfinished house resting on blocks of wood. Well-water good.	24	Fe. M.	Been bilious, and has suffered with headache for some time.	Tertian.
2 3 3	.05 ------ ------	Hilly country, soil sandy.	House rests on slope of sandy hill. Water good.	60	Fe. M.	Been subjected to unusual labor within a few days.	Tertian.
3 4 4	------ ------ ------	Fine open farming country. Soil sandy loam.	Surroundings good.	37	Ma. M.	Been accustomed to work in a saw mill. Was taken sick immediately on going into the harvest field.	Tertian.

* Ma.—Male. Fe.—Female. M.—Married.

TABLE.—CONTINUED.—*Cases of Intermittent*

CASE.	Date of Attack.	Date of first Visit.	Date of Meteorological Observation.	TEMP.			GRAINS OF VAPOR IN A CUBIC FOOT OF AIR.			BAROMETRIC PRESSURE. REDUCED TO 32° F.				PER CENT OF CLOUDINESS.			PREVAILING DIRECTION AND VELOCITY OF WIND.		Ozone, Night, 9 P. M. to 7 A. M.
				7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	Mean.	7 A. M.	2 P. M.	9 P. M.	Direction.	Miles Per Hour. *	
36	July 25	July 27	July 23.	67	86	68	6.55	6.58	5.78	29.44	29.40	29 40	29.42	10	5	50	N. W. & E.	2.	2
			" 24.	77	89	67	6.71	5.35	5.60	29 42	29.29	29.24	29.32	5	10	5	E. & S.	2.	2
			" 25.	71	84	75	6.14	7.17	8.05	29.20	29.09	29.05	29.11	50	50	90	S. E.	1–4	2
37	21	29	" 22.	66	86	68	5 72	6.26	5.20	29.31	29.31	29.40	29.34	00	30	95	N. W.	1–4	1
			" 23.	67	86	68	6.55	6.58	5.78	29.44	29.40	29.40	29.42	10	5	50	N. W. & E.	2.	2
			" 24.	77	89	67	6.71	5.35	5.60	29.42	29.29	29.24	29.32	5	10	5	E. & S.	2.	2
38	30	31	" 28.	72	90	76	8.10	8 20	7.90	29.08	29.00	28.96	29.02	90	40	90	S.	2.	1
			" 29.	73	91	71	7.57	6.29	6.14	29.04	29.03	29.05	29.04	90	25	20	N.	2–4	4
			" 30.	69	90	69	5.97	5.25	5.80	29.14	29.12	29.17	29.14	00	5	00	N.	2.	1
39	28	31	" 26.	77	92	73	8.57	7.90	8.35	29.07	29.02	29.05	29.05	30	80	90	S. W.	2.	2
			" 27.	72	86	72	8.10	6.58	8.00	29.08	29.06	29.09	29.08	90	90	50	S.	2-4-2	2
			" 28.	72	90	76	8.10	8.20	7.90	29.08	29.00	28.96	29.02	90	40	90	S.	2.	1
40	29	31	" 27.	72	86	72	8.10	6.58	8.00	29.08	29 06	29.09	29.08	90	90	50	S.	2.	2
			" 28.	72	90	76	8.10	8.20	7.90	29.08	29.00	28.96	29.02	90	40	90	S.	2.	1
			" 29.	73	91	71	7.57	6.29	6.14	29.04	29.03	29.05	29.04	90	25	20	N.	2–4	4
41	Aug 2	Aug 4.	" 31.	72	87	73	6 66	6.14	5.92	29.22	29.19	29.18	29.20	5	30	00	E.	4–2	1
			Aug. 1..	70	91	75	6.25	5.99	6.30	29.22	29.17	29.17	29.19	25	80	20	S. E. & S. W.	2.	2
			" 2..	75	92	68	6.95	6.79	5.78	29.16	29.10	29.12	29.13	50	10	00	W.	1–4	1
42	4	6.	" 2..	75	92	68	6.95	6.79	5.78	29.16	29.10	29.12	29.13	50	10	00	W.	1–4	1
			" 3..	66	82	60	5 72	4.99	4.68	29.20	29.14	29.18	29.18	00	10	00	N. W.	2.	1
			" 4..	57	81	56	4.76	4 60	4.11	29.26	29.22	29.20	29.23	00	25	00	W. & N.	2.	00
43	9	13	" 7..	68	85	73	5.11	6.37	6.87	28.89	28.84	28.85	28.86	100	75	10	W.	2–4	2
			" 8..	64	88	66	5.61	4.47	4.28	28.91	28.82	28.86	28.87	5	50	00	S. W.	2-12-2	3
			" 9..	61	81	61	4.83	5.31	5.72	28.88	28.84	28.92	28.88	90	90	00	W.	2.	2
44	12	14	" 10.	61	82	61	5.24	4.51	5.11	29.00	28.99	29.08	29.02	00	90	00	N. W.	1–4	3
			" 11.	59	83	74	5 08	4.66	5.24	29.15	29.11	29.06	29.10	00	30	90	N. & S.	2.	00
			" 12.	66	87	70	6.72	5.56	5.66	29.00	28.98	28.95	28.98	80	15	00	W. & N.	3.	4
45	12	14	" 10.	61	82	61	5.24	4 51	5.11	29.00	28.99	29.07	29.02	00	90	00	N. W.	4–2	3
			" 11.	59	83	74	5.08	4.66	5.24	29.14	29.11	29.05	29.10	00	30	90	N. & W. & S.	2.	0
			" 12.	66	87	70	6.72	5.56	5.66	29.00	28.97	28.95	28.97	80	15	00	W. & N.	2.	3
46	7.	14	" 5..	59	86	71	4.53	5.95	4.78	29.19	29.12	29.08	29.13	10	00	10	N. W.	1.	1
			" 6..	63	82	63	5 15	5.35	6.10	29.05	29.06	28 94	29.02	5	90	00	W.	2.	4
			" 7..	68	85	73	5.11	6.37	6.87	29.88	28.84	28.84	28.86	100	75	10	W.	2.	2
47	10	14	" 8..	64	88	66	5.61	4.47	4.28	28.91	28.82	28.86	28.87	5	50	00	W.	2-12-2	3
			" 9..	61	81	61	4.83	5.31	5.72	28.89	28.84	28.91	28.88	90	90	00	W.	2.	2
			" 10.	61	82	61	5.24	4.51	5.11	29.00	28.99	29.07	29.02	00	90	00	N.	2-4-2	3
48	15	16	" 13.	65	65	62	6.51	6 51	5.91	28.98	28.95	28.92	28.95	60	100	95	N. E.	2.	3
			" 14.	62	70	62	6.25	6.25	5.91	28.88	28.85	29.00	28.90	100	95	40	N. W.	2.	2
			" 15.	61	66	63	6.06	6.72	6.10	28.98	28.98	28.99	28.98	100	100	100	N. E.	2.	3
49	15	18	" 13.	65	65	62	6.51	6.51	5 91	28.98	28.95	28.92	28.95	60	100	95	N. E.	2.	3
			" 14.	62	70	62	6.25	6.25	5.91	28.88	28.85	29.00	28.90	100	95	40	N. W.	2.	2
			" 15.	61	66	63	6.06	6.72	6.10	28.98	28.98	28.99	28.98	100	100	100	N. E.	2.	3
50	16	18	" 14.	62	70	62	6.25	6.25	5.91	28.88	28.85	29.00	28.90	100	95	40	N. W.	2.	2
			" 15.	61	66	63	6.06	6.72	6.10	28.98	28.98	28.99	28.98	100	100	100	N. E.	2.	3
			" 16.	62	73	61	5.91	6.87	6.06	29.00	28.99	29.01	28.99	100	100	20	N. W.	2.	1
51	16	18	" 14.	62	70	62	6.25	6.25	5.91	28.88	28.85	29.00	28.90	100	95	40	N. W.	2.	2
			" 15.	61	66	63	6.06	6 72	6.10	28.98	28.98	28 99	28.98	100	100	100	N. E.	2.	3
			" 16.	62	73	61	5.91	6.87	6.06	29.00	28.99	29.01	28.99	100	100	20	N. W.	2.	1
52	11	17	" 9..	61	81	61	4.83	5 31	5.72	28.89	28.84	28.91	28.88	90	90	00	W.	2.	2
			" 10.	61	82	61	5.24	4.51	5.11	29.00	28.99	29.07	29.02	00	90	00	N.	2-4-2	3
			" 11.	59	83	74	5.08	4.66	5.24	29.14	29.11	29.05	29.10	00	30	90	N. & W. & S.	2.	0
53	18	23	" 16.	62	73	61	5.91	6.87	6.06	29.00	28.99	29.01	28.99	100	100	20	N. W.	2.	1
			" 17.	58	84	64	5.21	4.81	5.94	29 08	29.05	29.10	29.07	25	30	00	N. & E.	2.	1
			" 18.	60	82	63	5.54	5.81	6.10	29.14	29.11	29.14	29.13	00	50	10	N. W.	2.	0

* Explained in foot-note on page 198.

Fever, and Coincident Conditions.

Ozone, Day, 7 A. M. to 2 P. M.	Rainfall, Inches.	Character of Surrounding Country, and Nature of Soil.	Sanitary Surroundings of Habitation.	Age, in Years.	Sex and Social Condition.*	Recent Exposures, Excesses, and Deprivations.	Type of Disorder.
3 4 4	------ ------ ------	Same as 35	Same as 35	12	Fe.	Has had a hard cold for two weeks.	Tertian.
3 4 4	.18 ------ -----	Same as 33	Same as 33	4	Fe.	Nothing unusual	Tertian.
2 3 3	.05 ------ ------	Same as case 10	Much woods about house. House poor. Water fair.	14	Fe.	Has had diarrhea for 2 weeks	Tertian.
2 3 2	------ ------ .05	Same as case 33	Good house and good surroundings.	26	Ma.	Nothing known	Tertian.
2 2 3	-- --- .05 ------	Rolling and good farming country. Soil sandy loam	House low on ground and open. Well-water good.	8	Fe.	Child teething. Changed long clothes for short one week ago.	Quotidian.
4 4 2	------ ------ ------	New land near ponds. Soil sandy.	House situated among other houses built for mill hands. Houses of rough boards. Water good.	11	Fe.	Not used to being in sunshine. Went berrying and was taken sick.	Remittent.
2 4 3	------ ------ ------	Same as case 10	House low on ground. Well-water good.	34	Fe. M.	Out all the night previous and became exhausted, and was exposed to night air.	Tertian.
3 3 4	------ ------ ------	----------------------	Surroundings fair. Well-water good.	27	Ma.	Nothing unusual	Quotidian.
4 2 00	------ .04 ------	Rolling farming country. Soil sandy loam.	House low on ground. Well-water bad.	26	Fe. M.	Worked hard at moving. Nursing babe at same time.	Tertian.
4 3 4	----- .04 ------	Level farm land. Soil clay loam. Small swamp near.	House placed recently on site of old house torn down. Present house on blocks of wood. Well 15 ft. deep, contains surface water.	38	Ma. M.	No unusual exposure, etc., unless to those referring to habitation.	Quotidian.
4 4 3	------ ------ ------	Same as case 45	Same as case 45	29	Fe. M.	Reduced by nursing child. Otherwise same as case 45.	Tertian.
3 4 4	------ ------ ------	Same as case 45	Same as case 45	10	Ma.	Same as case 45	Tertian.
4 4 4	.87 .06 .23	Rolling farm'g land. Soil sandy. Large swamp ½ mile from house.	House on blocks of wood. No cellar. Well recipient of surface water.	2	Ma.	Been having diarrhea for some time. Other members of family had been having ague and diarrhea.	Quotidian.
4 4 4	.87 .06 .23	Same as case 1	House low on ground. Well recipient of surface water.	26	Ma. M.	Been ailing all summer	Tertian.
4 4 2	.06 .23 ------	Farming land. Land rolling. Soil sandy.	House old and built of logs. Small swamp near. Water good.	27	Ma. M.	Been ailing all summer. Resided in Ohio until the preceding May.	Tertian.
4 4 2	.06 .23 ------	Rolling farm'g land. Soil sandy.	House, on border of pond of still water, is a rough board house. Well-water good.	25	Ma. M.	Been used to mill work and went into the harvest field to work. Worked in rain.	Tertian.
4 4 3	------ ------ .04	Same as case 1	House low and sanitary surroundings not good. Well-water not good.	¼	Ma.	Mother not well. Child recently had diarrhea.	Tertian.
2 3 4	------ ------ .22	Same as case 48	House an old log house with a damp cellar beneath. Every thing about the house damp. Surface water in well.	33	Ma. M.	Been at work on marsh. Had been exposed to night air a good deal.	Tertian.

* Ma.—Male. Fe.—Female. M.—Married.

TABLE.—CONTINUED.—*Cases of Intermittent*

CASE.	Date of Attack.	Date of first Visit.	Date of Meteorological Observation.	TEMP.			GRAINS OF VAPOR IN A CUBIC FOOT OF AIR.			BAROMETRIC PRESSURE. REDUCED TO 32° F.				PER CENT OF CLOUDINESS.			PREVAILING DIRECTION AND VELOCITY OF WIND.		Ozone, Night, 9 P. M. to 7 A. M.
				7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	Mean.	7 A. M.	2 P. M.	9 P. M.	Direction.	Miles per Hour. *	
54	Aug 20	Aug 23	Aug. 18.	60	82	63	5.54	5.81	6.10	29.14	29.11	29.14	29.13	00	50	10	N. W.	2.	0
			" 19.	64	87	71	6.29	5.85	6.45	29.17	29.14	29.14	29.15	00	30	25	N. W. & E.	2.	1
			" 20.	62	84	69	5.91	6.50	7.37	29.18	29.12	29.12	29.14	25	50	20	S. E.	2.	1
55	20	23	" 18.	60	82	63	5.54	5.81	6.10	29.14	29.11	29.14	29.13	00	50	10	N. W.	2.	0
			" 19.	64	87	71	6.29	5.85	6.45	29.17	29.14	29.14	29.15	00	30	25	N. W. & E.	2.	1
			" 20.	62	84	69	5.91	6.50	7.37	29.18	29.12	29.12	29.14	25	50	20	S. E.	2.	1
56	21	23	" 19.	64	87	71	6.29	5.85	6.45	29.17	29.14	29.14	29.15	00	30	25	N. W. & E.	2.	1
			" 20.	62	84	69	5.91	6.50	7.37	29.18	29.12	29.12	29.14	25	50	20	S. E.	2.	1
			" 21.	70	87	72	6.91	5.85	6.03	29.10	29.02	29.04	29.05	15	60	25	S. E.	2.	2
57	24	24	" 22.	70	85	67	7.26	5.77	7.30	28.98	28.93	29.06	28.99	100	95	100	S.	2.	3
			" 23.	66	69	67	6.72	7.00	7.30	29.03	28.98	28.96	28.99	100	100	100	N. & S. E.	2.	1
			" 24.	63	68	63	6.45	6.77	6.45	28.98	29.02	29.07	29.03	100	95	100	N. W.	2.	3
58	21	25	" 19.	64	87	71	6.29	5.85	6.45	29.17	29.14	29.14	29.15	00	30	25	N. W. & E.	2.	1
			" 20.	62	81	69	5.91	6.50	7.37	29.18	29.12	29.12	29.14	25	50	20	S. E.	2.	1
			" 21.	70	87	72	6.91	5.85	6.03	29.10	29.02	29.01	29.05	15	60	25	S. E.	2.	2
59	19	25	" 17.	58	84	64	5.21	4.81	5.94	29.08	29.05	29.10	29.07	25	30	00	N. & S.	2.	1
			" 18.	60	82	63	5.54	5.81	6.10	29.14	29.11	29.14	29.13	00	50	10	N. W.	2.	0
			" 19.	64	87	71	6.29	5.85	6.45	29.17	29.14	29.14	29.15	00	30	25	N. W. & E.	2.	1
60	23	26	" 21.	70	87	72	6.91	5.85	6.03	29.10	29.02	29.04	29.05	15	60	25	S. E.	2.	2
			" 22.	70	85	67	7.26	5.77	7.30	28.98	28.93	29.06	28.99	100	95	100	S.	2.	3
			" 23.	66	69	67	6.72	7.00	7.30	29.03	28.98	28.96	28.99	100	100	100	N. & S. E.	2.	1
61	25	25	" 23.	66	69	67	6.72	7.00	7.30	29.03	28.98	28.96	28.99	100	100	100	N. & S. E.	2.	1
			" 24.	63	68	63	6.45	6.77	6.45	28.98	29.02	29.07	29.03	100	95	100	N. W.	2.	3
			" 25.	64	81	69	5.61	6.22	6.29	29.10	29.03	29.06	29.06	15	50	5	N. W. & S. W.	2-4	3
62	26	26	" 24.	63	68	63	6.45	6.77	6.45	28.98	29.02	29.07	29.03	100	95	100	N. W.	2.	3
			" 25.	64	81	69	5.61	6.22	6.29	29.10	29.03	29.06	29.06	15	50	5	N. W. & S. W.	2-4	3
			" 26.	63	83	67	5.76	6.29	6.55	29.16	29.08	29.19	29.15	5	50	00	S. W.	2.	1
63	24	27	" 22.	70	85	67	7.26	5.77	7.30	28.98	28.93	29.06	28.99	100	95	100	S.	2.	3
			" 23.	66	69	67	6.72	7.00	7.30	29.03	28.98	28.96	28.99	100	100	100	N. & S. E.	2.	1
			" 24.	63	68	63	6.45	6.77	6.45	28.98	29.02	29.07	29.03	100	95	100	N. W.	2.	3
64	Sept 1.	Sept 3.	" 30.	56	72	61	4.89	4.68	5.72	29.27	29.23	29.15	29.22	40	100	90	W. & S. E.	2.	1
			" 31.	66	71	66	6.35	7.48	6.72	28.97	28.92	28.98	28.95	100	100	100	E. & W.	2-4	3
			Sept. 1.	53	51	52	4.11	4.86	3.58	29.08	29.05	29.05	29.06	100	100	10	N. W.	2.	4
65	3.	3.	" 1.	53	54	52	4.11	4.86	3.58	29.08	29.05	29.05	29.06	100	100	10	N. W.	2.	4
			" 2.	53	63	51	3.74	4.18	3.61	29.00	28.96	29.04	29.00	95	90	40	N. W.	2.	3
			" 3.	51	71	57	3.74	5.18	3.88	29.08	29.02	29.04	29.04	95	80	20	S. W.	4-12-2	3
66	3.	3.	" 1.	53	54	52	4.11	4.86	3.58	29.08	29.05	29.05	29.06	100	100	10	N. W.	2.	4
			" 2.	53	63	51	3.74	4.18	3.61	29.00	28.96	29.04	29.00	95	90	40	N. W.	2.	3
			" 3.	51	71	57	3.74	5.18	3.88	29.08	29.02	29.04	29.04	95	80	20	S. W.	4-12-2	3
67	3.	4.	" 1.	53	54	52	4.11	4.86	3.58	29.08	29.05	29.05	29.06	100	100	10	N. W.	2.	4
			" 2.	53	63	51	3.74	4.18	3.61	29.00	28.96	29.04	29.00	95	90	40	N. W.	2.	3
			" 3.	51	71	57	3.74	5.18	3.88	29.08	29.02	29.04	29.04	95	80	20	S. W.	4-12-2	3
68	2.	4.	Aug. 31.	66	71	66	6.35	7.48	6.72	28.97	28.92	28.98	28.95	100	100	100	E. & W.	2-4	3
			Sept. 1.	53	54	52	4.11	4.86	3.58	29.08	29.05	29.05	29.06	100	100	10	N. W.	2.	4
			" 2.	53	63	51	3.74	4.18	3.61	29.00	28.96	29.04	29.00	95	90	40	N. W.	2.	3
69	1.	4.	Aug. 30.	56	72	61	4.89	4.68	5.72	29.27	29.23	29.15	29.22	40	100	90	W. & S. E.	2.	1
			" 31.	66	71	66	6.35	7.48	6.72	28.97	28.92	28.98	28.95	100	100	100	E. & W.	2.4	3
			Sept. 1.	53	54	52	4.11	4.86	3.58	29.08	29.05	29.05	29.06	100	100	10	N. W.	2.	4
70	1.	4.	Aug. 30.	56	72	61	4.89	4.68	5.72	29.27	29.23	29.15	29.22	40	100	90	W. & S. E.	2.	1
			" 31.	66	71	66	6.35	7.48	6.72	28.97	28.92	28.98	28.95	100	100	100	E. & W.	2-4	3
			Sept. 1.	53	54	52	4.11	4.86	3.58	29.08	29.05	29.05	29.06	100	100	10	N. W.	2.	4
71	1.	5.	Aug. 30.	56	72	61	4.89	4.68	5.72	29.27	29.23	29.15	29.22	40	100	90	W. & S. E.	2.	1
			" 31.	66	71	66	6.35	7.48	6.72	28.97	28.92	28.98	28.95	100	100	100	E. & W.	2-4	3
			Sept. 1.	53	54	52	4.11	4.86	3.58	29.08	29.05	29.05	29.06	100	100	10	N. W.	2	4

* Explained in foot-note on page 198.

Fever, and Coincident Conditions.

Ozone, Day, 7 A. M. to 2 P. M.	Rainfall, Inches.	Character of Surrounding Country, and Nature of Soil.	Sanitary Surroundings of Habitation.	Age, in Years.	Sex and Social Condition.*	Recent Exposures, Excesses, and Deprivations.	Type of Disorder.
4 4 4	.22 ------ .05	Same as case 53	Same as case 53	12	Fe.	Had been over worked. Exposed to air of dwelling.	Tertian, then Quotidian.
4 4 4	.22 ------ .05	Same as case 53	Same as case 53	4	Fe.	That pertaining to house	Tertian.
4 4 4	------ .05 ------	Same as case 53	Same as case 53	34	Fe. M.	Been subjected to hard work. Nursing babe. Exposed to damp air of house.	Quotidian.
4 2 3	.83 ------ ------	Same as case 53	Same as case 53	7	Ma.	Exposed to damp air of house.	Tertian.
4 4 4	------ .05 ------	Same as case 51	Same as case 51	21	Fe. M.	Accustomed to house work. Had been out in the field all day picking berries on 21st.	Quotidian.
3 4 4	------ .22 ------	Rolling farm'g land. Soil sandy.	House low and built of rough boards. Water fair. Country new. Coal pits near for the manufacture of charcoal.	20	Ma.	Been working unusually hard in woods.	Quotidian.
4 4 2	------ .83 ------	New farm'g lands. Land rolling. Soil sandy.	House new. Sanitary surroundings fair. Water good.	9	Fe.	No known exposure	Quotidian.
2 3 4	------ ------ ------	Same as case 51	Same as case 51	3	Ma.	No known exposure. Been ailing for week previous.	Remittent.
3 4 4	------ ------ ------	Same as case 1	House good and on border of lake. Water good.	21	Ma.	Been ailing for week	Tertian.
4 2 3	.83 ------ ------	Hilly farming land. Soil sandy.	Sanitary surroundings fair	20	Ma.	Overworked in field on day of attack.	Tertian.
2 4 3	------ .77 ------	Same as case 48	Same as case 48	9	Fe.	Been ailing for some time	Quotidian.
3 3 4	----- ------ ------	Same as case 48	Same as case 48	1	Ma.	Nothing unusual	Tertian.
3 3 4	----- ------ ------	Same as case 1	Sanitary surroundings good	33	Ma. M.	Is generally an invalid. Worked unusually hard in store on day and night of the 1st inst.	Tertian.
3 3 4	------ ------ ------	Low farming land. Soil clay loam.	House comfortable. Well water not generally good, low at time of attack.	31	Ma.	Clearing land and working hard in night air.	Tertian.
4 3 3	.77 ------ ------	Rolling farm'g land. Soil sandy.	House low on ground. Well 35 ft. deep. Water good.	32	Fe. M.	Worked in a damp room one week before attack and had been ailing until day of attack.	Tertian.
2 4 3	----- .77 ------	Same as case 59	Same as case 59	44	Ma. M.	Been working in a swamp for some time previous to attack.	Quotidian.
2 4 3	------ .77 ------	Same as case 59	Same as case 59	16	Fe.	Been ailing all summer	Remittent.
2 4 3	------ .77 ------	Same as case 59	Same as case 59	19	Fe.	No known unusual exposure.	Tertian.

* Ma.—Male. Fe.—Female. M.—Married.

TABLE—CONTINUED—*Cases of Intermittent*

CASE.	Date of Attack.	Date of first Visit.	Date of Meteorological Observation.	TEMP.			GRAINS OF VAPOR IN A CUBIC FOOT OF AIR.			BAROMETRIC PRESSURE. REDUCED TO 32° F.				PER CENT OF CLOUDINESS.			PREVAILING DIRECTION AND VELOCITY OF WIND.		Ozone, Night, 9 P. M. to 7 A. M.
				7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	Mean.	7 A. M.	2 P. M.	9 P. M.	Direction.	Miles per. Hour. *	
72	Sept 5.	Sept 6.	Sept. 3..	51	71	57	3.74	5.18	3.88	29.08	29.02	29.04	29.04	95	80	40	S. W.	4-12-2	3
			" 4..	55	76	60	4.46	5.06	5 24	29.06	29.02	29.08	29.05	00	80	10	S. W.	2-4-2	3
			" 5..	57	66	58	4.76	5.42	4.92	29.16	29.23	29.30	29.23	95	100	80	N. E.	2.	2
73	6.	7.	" 4..	55	76	60	4.46	5.06	5.24	29.06	29.02	29.08	29.05	00	80	10	S. W.	2-4-2	3
			" 5..	57	66	58	4.76	5.42	4.92	29.16	29.23	29.30	29.23	95	100	80	N. E.	2.	2
			" 6..	56	66	50	4.61	4.37	3.73	29.36	29.35	29.40	29.37	75	100	00	N. & E.	2.	3
74	2.	8.	Aug. 31.	66	71	66	6.35	7.48	6 72	28.97	28.92	28.98	28.95	100	100	100	E. & W.	2-4	3
			Sept. 1..	53	54	52	4.11	4.86	3.58	29.08	29.05	29.05	29.06	100	100	10	N. W.	2.	4
			" 2..	53	63	51	3.74	4.18	3.61	29.00	28.96	29.04	29.00	95	90	40	N. W.	2.	3
75	7.	10	" 5..	57	66	58	4.76	5.42	4.92	29.16	29.23	29.30	29.23	95	100	80	N. E.	2.	2
			" 6..	56	66	50	4.61	4 37	3.73	29.36	29.35	29.40	29.37	75	100	00	N. & E.	2.	3
			" 7..	51	69	56	4.12	4.09	4.89	29.26	29.31	29.30	29.29	5	90	10	N. E.	2.	1
76	8.	11	" 6..	56	66	50	4.61	4.37	3.73	29.36	29.35	29.40	29.37	75	100	00	N. & E.	2.	3
			" 7..	51	69	56	4.12	4.09	4.89	29.26	29.31	29.30	29.29	5	90	10	N. E.	2.	1
			" 8..	58	75	54	5.21	4.66	4.51	29.33	29.25	29.26	29.28	5	10	00	N. E. & S. W.	2.	1
77	8.	12	" 6..	56	66	50	4 61	4.37	3.73	29.36	29.35	29.40	29.37	75	100	00	N. & E.	2.	3
			" 7..	51	69	56	4.12	4.09	4.89	29.26	29.31	29.30	29.29	5	90	10	N. E.	2.	1
			" 8..	58	75	54	5.21	4.66	4.54	29.33	29.25	29.26	29.28	5	10	00	N. E. & S. W.	2.	1
78	10	12	" 8..	58	75	54	5.21	4.66	4.54	29.33	29.25	29.26	29.28	5	10	00	N. E. & S. W.	2.	1
			" 9..	57	72	61	5.05	5.18	5.40	29.20	29.12	29.09	29.14	30	100	10	S. E.	2.	1
			" 10.	58	62	64	5.51	6.25	6.65	29.03	28.95	28.96	28.97	100	100	100	N. E.	2.	3
79	10	12	" 8..	58	75	54	5.21	4.66	4.54	29.33	29.25	29.26	29.28	5	10	00	N. E. & S. W.	2.	1
			" 9..	57	72	61	5.05	5.18	5.40	29.20	29.12	29.09	29.14	30	100	10	S. E.	2.	1
			" 10.	58	62	64	5.51	6.25	6.65	29.03	28.95	28.96	28.97	100	100	100	N. E.	2.	3
80	12	13	" 10.	58	62	64	5.51	6.25	6.65	29.03	28.95	28.96	28.97	100	100	100	N. E.	2.	3
			" 11.	64	73	63	6.65	7.21	6.10	29.01	29.00	29.05	29.02	100	100	5	W. & S. E.	2.	1
			" 12.	64	76	62	6.29	6.83	6.50	29 16	29.11	29.19	29.15	100	100	10	S. E.	2.	3
81	13	14	" 11.	64	73	63	6.65	7.21	6.10	29.01	29.00	29.05	29.02	100	100	5	W. & S. E.	2.	1
			" 12.	64	76	62	6.29	6.83	6.50	29.16	29.11	29.19	29.15	100	100	10	S. E.	2.	3
			" 13.	60	83	65	5.87	6.95	6.51	29.24	29.21	29.22	29.22	25	95	5	S. E. & S. W.	2.	0
82	14	15	" 12.	64	76	62	6.29	6.83	6.50	29.16	29.11	29.19	29.15	100	100	10	S. E.	2.	3
			" 13.	60	83	65	5.87	6.95	6.51	29.24	29.21	29.22	29.22	25	95	5	S. E. & S. W.	2.	0
			" 14.	61	82	68	6.06	6.10	6.43	29.24	29.12	29.05	29.14	00	40	00	S. E.	2.	0
83	16	18	" 14.	61	82	68	6.06	6.10	6.43	29.24	29.12	29.05	29.14	00	40	00	S. E.	2.	0
			" 15.	68	82	65	6.43	6.41	6.87	28 99	28.87	28.98	28.95	10	100	90	S. E.	2-4-2	2
			" 16.	62	80	66	6.25	4.45	5.72	29.08	29.04	29.09	29.07	100	00	20	S. W. & N. W.	2-4	2
84	15	18	" 13.	60	83	65	5.87	6.95	6.51	29.24	29.21	29.22	29.22	25	95	5	S. E. & S. W.	2.	0
			" 14.	61	82	68	6.06	6.10	6.43	29.24	29.12	29.05	29.14	00	40	00	S. E.	2.	0
			" 15.	68	82	65	6.43	6.41	6.87	28.99	28.87	28.98	28.95	10	100	90	S. E.	2-4-2	2
85	18	19	" 16.	62	80	66	6.25	4.45	5.72	29.08	29.04	29.09	29.07	100	00	20	S. W. & N. W.	2-4	2
			" 17.	55	65	43	4.74	6.17	3.16	29.11	29.05	29.16	29.11	100	15	5	N. W.	4-12-2	3
			" 18.	43	64	41	3.16	2.96	3.52	29.20	29.16	29.17	29.18	00	5	00	W.	2-12-2	1
86	17	20	" 15.	68	82	65	6.43	6.41	6.87	28.99	28.87	28.98	28.95	10	100	90	S. E.	2-4-2	2
			" 16.	62	80	66	6.25	4.45	5.72	29.08	29.04	29.09	29.07	100	00	20	S. W. & N. W.	2-4	2
			" 17.	55	65	43	4.74	6.17	3.16	29.11	29.05	29.16	29.11	100	15	5	N. W.	4-12-2	3
87	14	20	" 12.	64	76	62	6.29	6.83	6.50	29.16	29.11	29.19	29.15	100	100	10	S. E.	2.	3
			" 13.	60	83	65	5.87	6.95	6.51	29.24	29.21	29.22	29.22	25	95	5	S. E. & S. W.	2.	0
			" 14.	61	82	68	6.06	6.10	6.43	29.24	29.12	29.05	29.14	00	40	00	S. E.	2.	0
88	10	20	" 8..	58	75	54	5.21	4.66	4.54	29.33	29.25	29.26	29.28	5	10	00	N. E. & S. W.	2.	1
			" 9..	57	72	61	5.05	5.18	5.40	29.20	29.12	29.09	29.14	30	100	10	S. E.	2.	1
			" 10.	58	62	64	5.51	6.25	6.65	29.03	28.95	28.96	28.97	100	100	100	N. E.	2.	3
89	18	20	" 16.	62	80	66	6.25	4.45	5.72	29.08	29.04	29.09	29.07	100	00	20	S. W. & N. W.	2-4	2
			" 17.	55	65	43	4.74	6.17	3.16	29.11	29.05	29.16	29.11	100	15	5	N. W.	4-12-2	3
			" 18.	43	64	44	3.16	2.96	3.52	29.20	29.16	29.17	29.18	00	5	00	W.	2-12-2	1

* Explained in foot-note on page 198.

Fever, and Coincident Conditions.

Ozone, Day, 7 A. M. to 2 P. M.	Rainfall, Inches.	Character of Surrounding Country, and Nature of Soil.	Sanitary Surroundings of Habitation.	Age, in Years.	Sex and Social Condition.*	Recent Exposures, Excesses, and Deprivations.	Type of Disorder.
4 4 3	------ ------ ------	Same as case 51..........	Same as case 51..............	6	Ma.	No known unusual exposure.	Remittent.
4 3 4	------ ------ ------	Same as case 68..........	Same as case 68..............	6	Ma.	No known unusual exposure.	Tertian.
4 3 3	.77 ------ ------	Same as case 51..........	Same as case 51..............	21	Fe.	After working unusually hard on the 2d inst. was attacked, diarrhea, chill and fever.	Remittent.
3 4 4	------ ------ ------	Level farming land. Soil sandy loam.	House poor and near to woods. Cellar wet. Water good.	1	Ma.	No known exposure.........	Tertian.
4 4 3	------ ------ ------	Same as case 51..........	Same as case 51..............	45	Fe. M.	Worked hard in taking care of sick.	Tertian.
4 4 3	------ ------ ------	Land surrounded by swamps. Soil sandy.	House low on ground. Water good.	61	Fe.	Been ailing for 2 or 3 months. Has valvular disease of heart.	Tertian.
3 4 3	------ ------ .87	Same as case 1...........	Sanitary surroundings fair.....	19	Ma.	Went hunting on the 10th and had a chill on return.	Tertian.
3 4 3	------ ------ .87	Same as case 78..........	Same as case 78..............	10	Ma.	Been ailing for some time. First chill on the 10th inst.	Tertian.
3 2 3	.87 ------ ------	Good farming land. Soil sandy loam...........	House good. Well-water not good.	6	Fe.	Not been well for 3 weeks. First chill on 12th inst.	Tertian.
2 3 2	------ ------ ------	Same as case 1...........	House low. Sanitary surroundings not good. Water fair.	12	Fe.	No known exposure.........	Tertian.
3 2 3	------ ------ ------	Same as case 81..........	Same as case 81..............	5	Fe.	No known exposure.........	Tertian.
3 3 3	------ .46 ------	Farm on high land between two swamps. Soil sandy.	Low log house in a dilapidated condition—damp. Well-water good.	⅛	Fe.	No known exposure.........	Tertian.
2 3 3	------ ------ .46	Rolling farming land. Soil sandy.	House and surroundings in fair sanitary condition. Water good.	23	Ma.	Recently came from Ohio in a debilitated condition from dissipation.	Tertian. Quotidian, then Typo-malarial.
3 4 4	------ .11 ------	Same as case 83..........	Same as case 83..............	45	Ma.	No unusual exposures......	Tertian.
3 3 4	.46 ------ .11	High farming land. Soil sandy.	Low board house. Spring-water used.	36	Fe. M.	Enciente..................	Tertian.
3 2 3	------ ------ ------	Same as case 83..........	Same as case 83..............	22	Ma.	No unusual exposure........	Tertian.
3 4 3	------ ------ .87	Rolling farming land. Soil sandy.	House low. Water good......	9	Ma.	Unusually exposed to damp weather.	Remittent.
3 4 4	------ .11 ------	Same as case 88..........	Same as case 88..............	11	Fe.	No unusual exposure........	Quotidian.

* Ma.—Male. Fe.—Female. M.—Married.

TABLE.—CONTINUED.—*Cases of Intermittent*

CASE.	Date of Attack.	Date of first Visit.	Date of Meteorological Observation.	TEMP.			GRAINS OF VAPOR IN A CUBIC FOOT OF AIR.			BAROMETRIC PRESSURE, REDUCED TO 32° F.				PER CENT OF CLOUDINESS.			PREVAILING DIRECTION AND VELOCITY OF WIND.		Ozone, Night, 9 P.M. to 7 A.M.
				7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	Mean.	7 A. M.	2 P. M.	9 P. M.	Direction.	Miles per Hour. *	
90	Sept 21	Sept 22	Sept. 19.	48	69	48	3.06	3.66	3.47	29.18	29.07	29.11	29.12	5	100	00	S. W.	2.	2
			“ 20.	46	55	50	3.70	4.74	3.99	29.13	29.06	29.18	29.13	90	100	90	S. E & N. E.	2.	1
			“ 21.	42	69	48	3.30	4.09	4.01	29.29	29.31	29.32	29.31	00	10	00	N. E. & S. E.	2.	1
91	18	21	“ 16.	62	80	66	6.25	4.4	5.72	29.08	29.04	29.09	29.07	100	00	20	S. W. & N. W.	2-4.	2
			“ 17.	55	65	43	4.74	6.17	3.16	29.11	29.05	29.16	29.11	100	15	5	N. W.	4-12-2	3
			“ 18.	43	64	44	3.16	2.96	3.52	29.20	29.16	29.17	29.18	00	5	00	W.	2-12-2	1
92	22	23	“ 20.	46	55	50	3.70	4.74	3.99	29.13	29 06	29.18	29.13	90	100	90	S. E. & N. E	2.	1
			“ 21.	42	69	48	3.30	4.09	4.01	29.29	29.31	29.32	29.31	00	10	00	N. E. & S. E.	2.	1
			“ 22	46	71	54	3.50	7.13	3.70	29.36	29.28	29.26	29.30	00	5	00	S. E.	2.	0
93	19	24	“ 17.	55	65	43	4.74	6.17	3.16	29.11	29.05	29.16	29 11	100	15	5	N. W.	4-12-2	3
			“ 18.	43	64	44	3.16	2.96	3 52	29.20	29.16	29.17	29 18	00	5	00	W.	2-12-2	1
			“ 19.	48	69	48	3.06	3.06	3.47	29.18	29.67	29.11	29.12	5	100	00	S. W.	2.	2
94	23	25	“ 21.	42	69	48	3.30	4.09	4.01	29.29	29.31	29.32	29.31	00	10	00	N. E. & S. E.	2.	1
			“ 22.	46	71	54	3.50	7.13	3.70	29 36	29.28	29.26	29 30	00	5	00	S. E.	2.	0
			“ 23.	53	75	63	4.11	5.12	5.15	29.27	29.20	29.22	29.23	00	20	10	S. E. & S. W.	2-4-2	1
95	24	28	“ 22.	46	71	54	3.50	7.13	3.70	29.36	29.28	29.26	29.30	00	5	00	S. E.	2.	0
			“ 23.	53	75	63	4.11	5.12	5 15	29.27	29.20	29.22	29.23	00	20	10	S. E. & S. W.	2-4-2	1
			“ 24.	62	84	67	5.27	6.18	6 23	29.23	29.17	29.17	29.19	10	30	00	S. W.	2-4.	3
96	28	28	“ 26.	62	71	69	5 96	7.13	6.63	29.21	29.18	29.20	29.20	20	50	50	S. W. & N. E.	2-4.	1
			“ 27.	62	74	67	5.91	7.08	6 55	29.17	29.16	29.12	29.15	50	20	50	E.	4-2.	3
			“ 28.	62	69	55	6.25	5 97	4.74	29.24	29.26	29.28	29.26	75	90	00	S. E. & N. E.	2.	1
97	22	28	“ 20.	46	55	50	3.70	4.74	3.99	29.13	29.06	29.18	29 13	90	100	90	S. E. & N. E.	2.	1
			“ 21.	42	69	48	3.30	4 09	4.01	29.29	29 31	29 32	29.31	00	10	00	N. E. & S. E.	2.	1
			“ 22.	46	71	54	3 50	7.13	3 70	29.36	29.28	29.26	29.30	00	5	00	S. E.	2.	0
98	27	29	“ 25.	65	80	65	6.17	6.03	6.17	29.22	29.15	29.14	29.17	50	90	00	S. W.	2-4-2	2
			“ 26.	62	71	69	5.91	7.13	6.63	29.21	29 18	29.20	29.20	20	50	50	S. W. & N. E.	2-4	1
			“ 27.	62	74	67	5.91	7.08	6.55	29.17	29.16	29.12	29.15	50	20	50	E.	4-2	3
99	26	Oct. 1	“ 24.	62	81	67	5.27	6.18	6.23	29.23	29.17	29.17	29.19	10	30	00	S. W.	2-4	3
			“ 25.	65	80	65	6.17	6.03	6.17	29.22	29.15	29.14	29.17	50	90	00	S W.	2-4-2	2
			“ 26.	62	71	69	5.91	7.13	6.63	29.21	29.18	29.20	29.20	20	50	50	S. W. & N. E.	2-4	1
100	28	1	“ 26.	62	71	69	5.91	7.13	6.63	29.21	29.18	29 20	29.20	20	50	50	S. W. & N. E.	2-4	1
			“ 27.	62	74	67	5.91	7.08	6.55	29.17	29.16	29.12	29.15	50	20	50	E.	4-2	3
			“ 28.	62	69	55	6.25	5.97	4.74	29.24	29.26	29.28	29.26	75	90	00	S. E. & N. E.	2.	1
101	29	2	“ 27.	62	74	67	5 91	7.08	6.55	29.17	29.16	29.12	29.15	50	20	50	E.	4-2	3
			“ 28.	62	69	55	6.25	5.97	4.74	29.24	29.26	29.28	29 26	75	90	00	S. E. & N. E.	2.	1
			“ 29	55	80	66	4.74	6.99	6.35	29.24	29.24	29.10	29.19	15	10	00	E. & S.	2-4-2	2
102	28	5	“ 26.	62	71	69	5.91	7.13	6 63	29.21	29.18	29.20	29.20	20	50	50	S. W. & N. W.	2-4	1
			“ 27.	62	74	67	5.91	7 08	6.55	29.17	29.16	29.12	29.15	50	20	50	E.	4-2	3
			“ 28.	62	69	55	6.25	5.97	4.74	29.24	29.26	29.28	29.26	75	90	00	S. E. & N. E.	2.	1
103	Oct. 4	7	Oct 2..	59	66	58	5.69	6.04	5.51	29.15	29 08	29.08	29.10	100	100	100	N. E.	2.	3
			“ 3..	62	80	68	6.25	5.18	5.30	29.07	28.97	28.74	28.93	100	10	25	S. E.	2-4-2	1
			“ 4..	50	54	41	3.48	3.06	2.74	28.80	28.90	29.11	28.94	75	75	00	N. W.	4.	1
104	6	8	“ 4..	50	54	41	3.48	3 06	2.74	28.80	28.90	29.11	28.94	75	75	00	N. W.	4.	1
			“ 5..	37	47	35	2.56	2.90	2.40	29.20	29.04	29 26	29.17	00	90	00	N. W.	2-12-2	4
			“ 6..	33	59	38	2.22	3.01	2.65	29.41	29.39	29.45	29.42	00	10	00	W.	2-4-2	1
105	6	14	“ 4..	50	54	41	3.48	3.06	2 74	28.80	28 90	29.11	28.94	75	75	00	N. W.	4.	1
			“ 5..	37	47	35	2.56	2 90	2.40	29.20	29.04	29.26	29.17	00	90	00	N. W.	2-12-2	4
			“ 6..	33	59	38	2.22	3.01	2.65	29 41	29.39	29.45	29.42	00	10	00	W.	2-4-2	1
106	11	16	“ 9..	47	64	52	3.88	3.98	4.56	29.17	29.16	29.12	29.15	25	90	100	W. & E.	2.	4
			“ 10.	48	58	41	3 85	1 91	3.19	29.02	28.82	28.96	28.93	100	90	100	S. E. & W.	4.	4
			“ 11.	38	45	41	2 89	3.14	3.19	29.10	29.20	29.28	29.19	100	90	100	N. W.	4-2	3
107	19	20	“ 17.	49	60	56	3.85	4.41	5.18	29.25	29.13	29.08	29.15	90	75	100	S. E.	2.	3
			“ 18.	57	59	52	5.05	5 08	4 26	29.07	29.07	29.12	29.08	100	100	100	N.	2.	3
			“ 19.	50	51	47	4.28	4.12	3.62	29.09	29.12	29.14	29.12	100	100	100	N.	2-4-2	

* Explained in foot-note on page 198.

Fever, and Coincident Conditions.

Ozone, Day, 7 A. M. to 2 P. M.	Rainfall, Inches.	Character of Surrounding Country, and Nature of Soil.	Sanitary Surroundings of Habitation.	Age in Years.	Sex and Social Condition.*	Recent Exposures, Excesses, and Deprivations.	Type of Disorder.
4 2 3	------ .16 ------	Same as case 1----------	House low. Well-water very poor.	4	Fe.	Over-exerted herself by a long walk in night air on Wednesday night, and was ailing until 21st inst., when chill and fever came on.	Quotidian.
3 4 4	------ .11 ------	Same as case 1----------	House low on ground. Barn close to house. Unsanitary surroundings. Procured water at different wells.	8	Ma.	Been complaining for 2 weeks previous to attack.	Remittent.
2 3 3	.16 ------ ------	Same as case 1----------	House low on ground. Damp excavation beneath house for cellar. Well-water poor.	1 & ⅓	Fe.	No unusual exposures--------	Tertian.
4 4 4	.11 ------ ------	Same as case 51---------	Same as case 51---------------	8	Ma.	Attacked while away from home visiting.	Tertian.
3 3 3	------ ------ ------	Same as case 1----------	House of rough boards. Low on ground. Well-water good.	54	Ma.	Worked unusually hard, and after excitement wore off began to feel ill.	Quotidian.
3 3 3	------ ------ ------	Same as case 1-----------	Sanitary surroundings of house fair, although house had been uninhabited for two weeks.	4	Fe.	Been subjected to excitement in moving and settling. Father a minister.	Tertian.
2 2 3	.99 ------ ------	Same as case 95---------	Same as case 95---------------	2	Ma.	Same as case 95--------------	Tertian.
2 3 3	.16 ------ ------	Same as case 1-----------	House low on ground. Water not good.	8	Fe.	No unusual exposure--------	Quotidian.
3 2 2	------ .99 ------	Same as case 95---------	Same as case 95---------------	35	Fe. M.	Same as case 95--------------	Tertian.
3 3 2	------ ------ .99	Level farm land. Soil sandy.	House low on ground and sanitary surroundings poor. Well-water good.	10	Fe.	Been ailing for two weeks. others in same house not well.	Tertian.
2 2 3	.99 ------ ------	Low swampy farm lands. Soil clay loam.	House low on ground and poorly constructed. Well-water poor.	18	Fe.	Been ailing for week before attack by chill.	Tertian.
2 3 4	------ ------ ------	New farm. Land rolling. Soil mixed.	House damp. Water in cellar. Water tastes bad.	4	Fe.	Drank a good deal of water before attack.	Tertian.
2 2 3	.99 ------ ------	High farming country. Soil sandy.	Log house. Damp, unventilated cellar. Water tastes of organic matter.	5	Fe.	Nothing unusual------------	Tertian.
3 4 4	------ ------ .12	In pine woods. Soil sandy.	Board house. Spring water—very poor.	37	Fe. M.	Suffered from diarrhea for one week before attacked by chill.	Tertian.
4 4 4	.12 ------ ------	Open farming country. Soil sandy.	Board house poorly constructed. Cellar dry. Water good.	30	Fe.	No unusual exposures-------	Quotidian.
4 4 4	.12 ------ ------	Rolling farming country. Soil sandy.	Sanitary surroundings fair. Water good.	22	Ma.	Was out hunting in woods all night preceding day of attack.	Tertian.
3 4 4	------ .64 †	Rolling farm land. Soil sandy.	House poor. Water good------	22	Ma.	Caught cold four days before attack.	Quotidian.
2 3 4	.12 ------ 1.21	Same as case 83---------	Same as case 83--------------	22	Ma.	Was sick with ague on Sept. 14th and 20th. See case 87.	Tertian.

* Ma.—Male. Fe.—Female. M.—Married.

† Not enough to measure.

TABLE.—CONTINUED.—*Cases of Intermittent*

CASE.	Date of Attack.	Date of first Visit.	Date of Meteorological Observation.	TEMP.			GRAINS OF VAPOR IN A CUBIC FOOT OF AIR.			BAROMETRIC PRESSURE. REDUCED TO 32° F.				PER CENT OF CLOUDINESS.			PREVAILING DIRECTION AND VELOCITY OF WIND.		Ozone, Night, 9 P. M. to 7 A. M.
				7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	7 A. M.	2 P. M.	9 P. M.	Mean.	7 A. M.	2 P. M.	9 P. M.	Direction.	Miles per Hour. *	
108	Oct. 20	Oct. 21	Oct. 18.	57	59	52	5.05	5.08	4.26	29.07	29.07	29.12	29.08	100	100	100	N.	2.	3
			" 19.	50	51	47	4.28	4.12	3.62	29.09	29.12	29.14	29.12	100	100	100	N.	2-4-2	4
			" 20.	42	44	40	3.06	2.80	2.65	29.24	29.17	29.15	29.18	100	100	90	N.	2-4-2	4
109	20	29	" 18.	57	59	52	5.05	5.08	4.26	29.07	29.07	29.12	29.08	100	100	100	N.	2.	3
			" 19.	50	51	47	4.28	4.12	3.62	29.09	29.12	29.14	29.12	100	100	100	N.	2-4-2	4
			" 20.	42	44	40	3.06	2.80	2.65	29.24	29.17	29.15	29.18	100	100	90	N.	2-4-2	4
110	29	31	" 27.	41	50	50	2.96	3.73	4.28	29 05	29.00	29.01	29.02	100	100	100	S. E.	4.	4
			" 28.	48	65	63	4.01	4.98	4.33	29.20	28.96	28.86	29.00	100	40	10	S. E.	2-4-12	2
			" 29.	47	52	41	3.12	2.81	2.54	29.11	29.18	29.25	29.18	50	20	00	N. W.	12-4-2	4
111	Nov 20	Nov 20	Nov. 18.	29	37	22	2.14	1.79	1.69	29.48	29.56	29.55	29.53	15	25	5	N. W.	2-4-2	4
			" 19.	26	32	26	1.93	2.17	1.93	29.57	29.56	29.55	29.56	50	100	30	N.W. & N.E.	2.	4
			" 20.	24	44	35	1.81	2.80	2.00	29.55	29.49	29.46	29.50	20	25	5	E.	2-4.	8
112	17	21	" 15.	51	51	47	4.42	4.42	3.88	28.99	28.97	29.09	29.02	10	100	100	S. W.	2-4.	3
			" 16.	37	52	41	2.80	3.02	2.74	29.18	29.17	29.14	29.16	25	50	50	S. W.	2-4-2	5
			" 17.	41	48	36	3.19	3.47	1.89	29.01	28.94	29.17	29.14	10	100	75	S. & W.	2-4-12	4
113	26	26	" 24.	44	49	47	3.52	4.00	3.88	29.03	28.90	28.99	28.97	100	100	100	E.	2.	7
			" 25.	48	50	48	4.01	4.28	4 01	28.93	28.66	28.73	28.77	100	100	100	S. E.	2.	7
			" 26.	46	51	42	3.76	4.05	3.06	28.59	28.37	28.49	28.48	100	100	90	E.	4-2.	4
114	26	30	" 24.	44	49	47	3.52	4.00	3.88	29.03	28.90	28.99	28.97	100	100	100	E.	2.	7
			" 25.	48	50	48	4.01	4.28	4.01	28.93	28.66	28.73	28.77	100	100	100	S. E.	2.	7
			" 26.	46	51	42	3.76	4.05	3.06	28.59	28.37	28.49	28.48	100	100	90	E.	4-2.	4
115	23	Dec. 6	" 21.	35	46	42	2.00	2.61	3.30	29.27	29.22	29.09	29.19	90	90	100	S. E.	4-2-12	5
			" 22.	43	41	38	3.41	2.60	2.65	29.17	29.27	29.35	29.26	100	90	100	W. & N. E.	4-2	4
			" 23.	40	45	44	2.86	3.39	3.52	29.32	29.21	29.16	29.23	100	100	100	N. E.	2-4-2	8
116	Dec. 5	6	Dec. 3..	24	38	29	1.81	2.00	1.82	29.24	29.20	29.23	29.22	10	00	00	S.	4-2	5
			" 4..	36	40	43	1.95	3.09	3.41	28.93	28.87	28.84	28.88	100	100	100	S. E.	4-12	4
			" 5..	35	34	33	2.19	2.11	2.22	28.71	28.66	28.71	28.69	90	100	100	S. W.	12.	4
117	18	20	" 16.	28	51	37	2.07	2.92	2.56	29.23	29.24	29.32	29.26	100	00	40	W. & S.	2.	4
			" 17.	32	50	34	2.37	2.82	2.33	29.23	29.29	29.48	29.34	100	25	75	S. & N. E.	2-4	4
			" 18.	29	36	40	1.55	2.48	3.09	29.48	29.33	29.26	29.36	80	100	100	E.	12-2	4
118	21	22	" 19.	52	58	51	4.56	4.64	4.42	29.28	29.20	29.31	29.26	90	75	100	W.	4-12-4	3
			" 20.	45	48	46	3.64	2.79	3.76	29.44	29.44	29.49	29.46	100	100	100	S. E.	4-12	4
			" 21.	44	61	44	3.52	4.83	3.52	29.54	29.50	29.52	29.52	100	5	25	S. E.	2.	0

* Explained in foot-note on page 198.

As recorded in the table, of the one hundred and eighteen cases, seventy-two persons were either reduced by previous sickness, or subjected to unusual exposures just previously to the attack. In forty-six cases no such relation of causation could be traced. That exposures and previous sickness increase the liability to attack the record seems to prove.

SEX.—Fifty-eight of the cases were males and sixty were females. Of those who were attacked after unusual exposures, thirteen were males and twelve females. Of those who were ill previously to attack, twenty were males and twenty-seven females. This difference was no doubt due partly to the greater liability of the female to disease or physical depression from many conditions characteristic of the female.

AGE.—Thirty-one of those cases attacked were under five years of age; 33 between the ages of 5 years and 20 years; 47 between the ages of 20 years and 50 years; while of those over 50 years of age only seven were attacked. Estimating the susceptibility to attack according to the age, the record declares the period of infancy to be the time when attacks are most liable to occur.

Fever and Coïncident Conditions.

Ozone, Day, 7 A. M. to 2 P. M.	Rainfall, Inches.	Character of Surrounding Country, and Nature of Soil.	Sanitary Surroundings of Habitation.	Age, in Years.	Sex and Social Condition.*	Recent Exposures, Excesses, and Deprivations.	Type of Disorder.
3 4 4	------ 1.21 ------	Same as case 1----------	Farm in border of village. Low lands near. Water good.	30	Ma.	No unusual exposures-------	Tertian.
3 4 4	------ 1.21 ------	Swamps and ponds near. Sandy soil.	House poor. Well-water fair--	1 & ½	Ma.	Had a cold for some time----	Quotidian.
3 2 4	.18 ------ ------	Same as case 61---------	Same as case 61--------------	23	Fe.	Been ailing for a week before attacked by chill.	Quotidian.
4 4 8	------ ------ ------	Pine woods. Soil sandy--	House poor. Water not good---	25	Ma.	No known exposures--------	Tertian.
3 4 4	.27 ------ ------	Same as case 109--------	Same as case 109--------------	2	Ma.	No known exposure---------	Quotidian.
7 3 4	------ .44 Mist.	Low farm lands. Soil mixed.	House of logs. Water good----	74	Ma. M.	No known exposure---------	Tertian.
7 3 4	------ .44 Mist.	Same as case 95---------	Same as case 95--------------	4	Fe.	Was sick the last of September. See case 95.	Tertian.
4 4 4	.20 ------ ------	Same as case 59---------	Same as case 59--------------	28	Ma.	No unusual exposure--------	Tertian.
4 3 4	------ .09 .23	Same as case 59 ---------	Same as case 59--------------	2	Ma.	No unusual exposure--------	Tertian.
3 4 4	------ ------ .70	Same as case 59 ---------	Same as case 59--------------	16	Ma.	No unusual exposure--------	Quotidian.
3 3 3	.13 .19 ------	Same as case 1 ----------	Same as case 90--------------	4	Fe.	Been ailing for some time. See case 90.	Quotidian.

* Ma.—Male. Fe.—Female. M.—Married.

This may be accounted for when we consider the physical tenderness of this age and the many exposures to which such cases are subjected by the thoughtlessness of parents and guardians.

TYPE OF DISEASE.—Of the 118 cases 25 were quotidian, 80 tertian, and 9 remittent. One case was first tertian, then quotidian, then typho-malarial. One case was first tertian, then quotidian, then double quotidian. There was also one case of congestive chill among the number.

WATER.—In 37 of the cases the water used for drinking and culinary purposes was unfit for use, being mostly surface water.

SANITARY SURROUNDINGS.—A large proportion of cases were related to bad sanitary surroundings. The houses in many instances were low on the ground and poorly constructed. In some instances there was standing water beneath the floor.

SWAMPS.—Twenty-seven cases were attacked while living near to marshes, although 91 cases occurred at a distance from any such influence.

SOIL.—The greatest number of cases occurred where the soil was sandy.

The porous condition of such soil giving a large surface for the evaporation of moisture, where rains are frequent, may partly account for the large number of cases occurring where they were subjected to such possible influences. It is certain that fewer cases of intermittent fever appear in this vicinity where there is a clay soil.

Temperature and Moisture.—The greatest number of cases occurred when the temperature was higher than the average for the month, and there was a correspondingly greater humidity. Sudden decrease in temperature with excess of moisture, exerting a chilling influence, would sometimes be followed by increase in the number of cases.

Atmospheric Pressure exceeded the average for the month, as a general rule, when there was an increase in the number of cases, and most generally with any of the cases. The exceptions were mostly after a rainfall when there was an increase in temperature and excess of moisture.

Clouds.—A marked relation seems to exist between the average per cent of clouds and the prevalence of intermittent fever. The least per cent of clouds occurred in the month of September, when there was by far the greatest number of cases recorded. The per cent of clouds influencing the radiation of heat may bear no small relation to the appearance of disease.

Direction and Velocity of Winds.—The prevailing direction of winds during the prevalence of this disease was west and south, and particularly during the month of September. The velocity of the wind was least in those months when there was the greatest prevalence of fevers, as in the months of August and September.

Ozone.—There was much less than the average of ozone at night, as indicated by Schönbein's test, when the greatest number of cases occurred. The same conditions obtain in regard to the amount of ozone by day. During the months of October, November, and December, when fevers were least prevalent, there was much more than the average of ozone. If we may believe that other meteorological conditions affect the presence or scarcity of the type of disease under consideration, understanding as we do the important relation oxygen bears to animal life, can we assume that an increase or decrease in the quantity of such an important element of the atmosphere as oxygen in a state of activity can itself exert no modifying influence upon this disease?

Rainfall.—Seventy-one of the cases recorded in the table occurred immediately after rains. Four-fifths of these cases occurred after rainfalls exceeding .20 of an inch. In the month of June 4 cases occurred immediately after a rainfall of .56 of an inch. Of seven cases about the first of September *all* were immediately after a fall of .77 of an inch. Later in the month five cases were after a fall of .99 of an inch, and five others after a fall of .11 of an inch. Four other cases in this month occurred immediately after a rainfall of .87 of an inch. Under no other conditions were the meteorological data repeated so often. With these cases there usually occurred an increase of temperature and a much greater absolute humidity than the average.

In summing up the meteorological and other conditions with which fevers may be associated, as exhibited in this record, is it not possible to discover sufficient causes for a disturbance of the system to produce the phenomena of disordered functions of digestion, and fevers with periodicity, without ascribing them to some particular, poisonous entity? If there is a particular cause, it is evident that many disturbing elements, rendering the system susceptible to attack, may be removed by attention to matters of sanitation and personal comfort.

EMANATIONS
FROM
DECAYING WOOD, A CAUSE OF DISEASE.

By J. H. KELLOGG, M. D

Of Battle Creek, Michigan,

member of the

STATE BOARD OF HEALTH,

And its Committee on Disposal of Excreta and Decomposing Organic Matter.

EMANATIONS FROM DECAYING WOOD A CAUSE OF DISEASE.

Numerous complaints have been made to this Board by citizens of the State living in the vicinity of large saw-mills, of injury to health resulting from the emanations from large deposits of sawdust undergoing decomposition, and it has been urged that the practice of allowing sawdust to accumulate in great quantities should be interdicted as a nuisance dangerous to public health. In the complaints which have been made it has been claimed that large masses of sawdust undergoing decay taint the atmosphere and give rise to zymotic diseases, particularly those of a malarial character. In a petition to the Board calling for aid in securing the abatement of a nuisance of this character at Fyfe Lake, signed by twenty-eight citizens of that place, it was claimed that the practice of depositing large quantities of sawdust in the margin of the lake was "killing out the white-fish put into the lake by the fish-commissioners" as well as causing sickness among the inhabitants.

Petitions and reports of this character have become sufficiently numerous to render it a matter of sufficient importance to be well worthy of careful attention and thorough investigation on the part of sanitarians and health authorities. A valuable investigation on this subject has already been made by this Board, the results of which were published in a paper by Dr. H. O. Hitchcock in the Report for 1878,* "Concerning the Relation of Wood Pavements and Wood Side-walks to Public Health." The paper referred to was based upon seventy replies received to a circular letter of inquiry to correspondents.

The great difficulty in the way of a satisfactory investigation of this subject is the want of reliable observation. While there has been for years a suspicion that injury to health might result from the decomposition of wood and other vegetable substances, attention has not been directed to the subject with sufficient care and accuracy of observation to obtain results of a very positive character, at least with the exception of a very few instances. Since having my attention specially called to the subject by several communications referred to the committee on the "Disposal of Decomposing Organic Matter," I have been at work collecting such facts as I could having a bearing on the subject. I believe it can be shown beyond room for reasonable doubt that the following propositions are true:—

1. That wood, whether as sawdust or in some other form, when under favorable conditions of warmth and moisture and exposed to the air, undergoes a

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* See pages 39-46 of the Report of the Michigan State Board of Health for 1878.

form of decomposition which is accompanied by the elimination of gases of an unpleasant, and, presumably, unwholesome character.

2. That the decomposition of wood is also accompanied by the development of bacteria and other low forms of life which are associated with the decomposition of nitrogenous substances, and which are in the light of modern investigations regarded as intimately connected with the development of many serious diseases.

The principal evidences upon which these propositions are based are as follows:—

1. Every one is familiar with the very unpleasant and often pungent odor arising from half-rotten wood. Any person who has never had evidence on this point can readily obtain it by raising from its place a plank which has lain partially imbedded in the soil for two or three years. The same sort of evidence may be obtained by stirring up the deposits in a wood-yard, or a heap of sawdust which has been undisturbed for a year or two. Indeed, we have not infrequently discovered the characteristic odor of this form of decomposition in the air of a sitting-room which contained a wood-box in which chips, pieces of bark, splinters, etc., had been allowed to accumulate for a long time. When these odors are strong, they will not infrequently produce head-ache and other symptoms similar to those produced by sewer-gas. This evidence can be readily obtained in an experimental way by keeping moist saw-dust in a warm place for a few days. In a very short time the peculiar offensive odors make their appearance. Of course, no very great harm can be expected to result from the odors themselves; but they are a *prima facie* evidence of the presence along with them of deleterious gases and poisonous germs, two morbific agents which are always associated when the source is animal or vegetable decomposition.

2. Vegetable chemistry and histology show very clearly that all vegetable substances, whether succulent plants, pulpy fruits, or firm woody structures, and whether fresh or green, or in a dry condition, contain nitrogenous compounds essentially the same in character, at least from a chemical standpoint, as the nitrogenous compounds which largely compose the tissues of animals. It is also well known that it is the decomposition of these nitrogenous compounds which gives rise to the most poisonous gases, and is accompanied by the development of the most dangerous classes of germs. At least, what evidence there is on this question points in this direction. It would be expected, then, that the decomposition of wood would be accompanied by the production of dangerous enemies to human life and health.

But this argument does not rest wholly upon presumptive evidence. At the last meeting of the American Public Health Association, held at Nashville, Prof. Wm. H. Brewer, of Yale College, President of the Board of Health of New Haven, Conn., read a valuable paper detailing a series of experiments which are very interesting in this connection. I quote from the paper as follows:—

> "When green wood is well soaked in cold water, a considerable quantity of albuminoid matter is dissolved out, remaining in solution in the water. This solution, even when very dilute, is extremely putrescible—more so, indeed, than any person present would deem possible, until he had tried the experiment (and it is an experiment I would advise you to make). The fact is as true of the hardest woods, as maple and locust, as it is of soft wood, like magnolia.
>
> "To illustrate: if a few pieces of such green wood, say of locust (I cite this species because it is a hard and particularly durable wood), be carefully freed from bark, and all foreign dirt, and put into the purest cold water—even distilled water—and let stand at the ordinary temperature of our climate, or our rooms, if the temperature at times rises to, say, by day, 60° or 70° Fahr., the water soon begins to become turbid or opalescent; this opalescence increases, in two to four days a thin

> pellicle forms on the surface, active putrefaction sets in, along with an abundant growth of the septic ferments, and the liquid soon becomes peculiarly and pungently stinking.
>
> "Without any visible evolution of gas, the liquid becomes very offensive to the smell, even when very dilute. The odor naturally varies with the kind of wood used, but in all cases I have tried, it is very rank, I think fully as much so as the same amount of *animal* matter in solution would produce. The intensity and rapidity of putrescence vary, of course, with the temperature, the kind of wood, the degree of concentration of the solution, and probably with the amount of tannin and other similar extractive matters contained in the original wood.
>
> "As in the case of other putrefaction, what the gases are which produce the stinking exhalations, we are entirely ignorant. It is probable that they are organic compounds of simpler molecular constitution than the albuminoids which furnished the necessary elements; and it is also probable that, as in other smells, the absolute amount exhaled is very small compared with the results produced on the senses.
>
> "If kept long enough, and of sufficient concentration, there is an abundant fungoid growth in the solution, and if kept in the light it grows darker in color, gradually becomes sour to the taste and smell, but continues offensive in odor for a long time, I know not how long, but in bottles partly filled, it certainly continues to smell bad for two years. Where the solution is kept in the dark, the odor seems more offensive than if the decay goes on in the light, but in this direction my experiments have not been nearly so numerous.
>
> "In the free air and full sunlight (and that is the condition to which piles and various other wooden structures and vegetable matter in swamps are subjected) along with the putrescence, a white fungus growth begins on the surface of the wood, which rapidly becomes slimy. This forms much more abundantly on the ends of the grain of the wood than on either the radial or tangential sides. If the solution is poured from the wood and kept in a separate vessel, and in the light, it grows dark, as already described, but the fungus growth goes on, modified, of course, by the temperature and the degree of concentration, and it continues offensive for an unknown period, or until the decay has become complete.
>
> "If the wood continues to be placed in successive portions of clean water, the soluble matter continues to be extracted for several months, even if the blocks be very small, and the tendency towards putrefaction grows less and less, but only closing after some months, and when the amount of water used has been enormous as compared with that of the wood. Finally, however, the soluble matter appears to be removed, the water then remains clear and the wood ceases to be covered with fungus growth, at least to any visible extent.
>
> "Timber, when thoroughly water-seasoned, is known to be very durable, and it is probable that it is so merely because of the removal of the soluble and putrescible albuminoids.
>
> "Experiments tried with the same woods in sea-water, and in brackish water (made by mixing two measures of fresh water with one of sea-water), show similar sanitary results; they are even actually intensified.
>
> "The turbidity begins sooner in sea-water than in fresh, in the few cases in which I have tried it, the film on the surface is more abundant, and the smell is more disgusting. The number of experiments, however, are much fewer than with fresh water.
>
> "Heart-wood and sap-wood act essentially alike in this matter; the difference is one of degree rather than of character.
>
> "The suggestiveness of these facts is almost too obvious to need comment, and yet I will add a word. Vast quantities of wood and vegetable matter, decaying in water, or in swamps, are too common.
>
> "If piles about our wharves and similar structures do not smell so bad, it is merely because the solution is more dilute. The decay goes on, however, and so with vegetable matter decaying in swamps, saw-dust in ponds, and so on to the end of a long chapter.
>
> "The exhalations of swamps, or of vegetable matter decaying in still water, is universally regarded as unwholesome, in climates where, for a part of the year, at least, the weather is as warm as we have it. So far as I know, there is no exception to this on the whole earth, and hence the general sanitary bearing of the observations here recorded need not be further argued."

We have repeated most of the experiments described by Dr. Brewer, with some variations, and have been able to fully verify his conclusions. In one instance the foul odors arising from a few ounces of wet saw-dust in a glass beaker rendered the air of a room so unpleasant even when doors and windows were kept widely open, that it became necessary to remove it out of doors. We are thoroughly convinced that such a mass of decomposing saw-dust as is often seen in the vicinity of saw-mills in lumber regions, may easily contaminate the air for miles around, and must exert a deleterious influence upon the health of those who inhale the poison-laden atmosphere.

But aside from these theoretical and experimental evidences, there is not an entire lack of practical evidence drawn from direct observation of the relation of decomposing wood to the production of disease. Dr. Coleman, member of the Richmond Academy of Medicine, in a paper read before that body and reported in the Virginia Medical Monthly, Vol. 8, No. 9, page 721, takes the ground that emanations from decaying wood are among the active causes of typhoid fever. In illustration, he said that the inmates of a house in Richmond, built over a pile of decaying shavings, had suffered from typhoid fever for four successive years. After the shavings were removed, no more cases of fever occurred. As another illustration, he stated that during the war his brigade occupied for some time, during the Virginia campaign, a field where the trees had been girdled and many had fallen down in decay. Next to his command another brigade encamped in a grove of living trees. Out of 850 men encamped in the belted woods, 600 had the so-called camp fever—really typhoid—whereas only five persons of those camping in the other brigade had the disease. He also called attention to the fact well remembered by the older physicians of the city,—that cases of typhoid fever were very numerous in the city immediately after the war, which he attributed to the fact that material and labor being scarce and expensive it was next to impossible to make proper repairs in the houses, many of which, in the wooden parts, were considerably advanced in decay, especially in the basement floors. He had no doubt that the unusual prevalence of fever observed, was due to the emanations from the decaying timbers. The Doctor instanced a number of cases which came under his notice in support of his view.

In his annual report to the office of this Board, Dr. L. S. Stevens, health officer of Muir, called attention to the unusual frequency of malarial diseases in a quarter of the town in which there are large deposits of decomposing saw-dust. In response to a letter addressed to him asking for a more definite report of his observations, I received the following:—

> "With reference to the effects of decomposing saw-dust, would say that I could not account for the excess of cases of malarial fever in that part of our town only in presuming that it might be from the decomposition of the sawdust in that locality. The village is mostly located upon bluffs along the river, yet in the immediate vicinity of the river the surface is level and wet. There are four large saw-mills along the river within one mile. The surface of the ground is covered, and the holes and wet places are filled with saw-dust and debris from the logs that are floated down to this place. After accumulating and lying for years, it seems to me that this decomposing wood has become a fruitful source of malaria. Observation convinces me that there are nearly double as many cases in the immediate vicinity of this locality as in any other parts of the town. I firmly believe that decomposing saw-dust is a fruitful source of miasmatic diseases."

It cannot be denied that a mass of moist, decomposing saw-dust furnishes just such conditions as are known to be favorable to the development of the cause or causes of malarial disease; but more observations are needed to establish a direct causative relation between the decomposition of saw-dust or wood in other forms and malarial poisoning.

Dr. Thos. F. Wood, Secretary of the State Board of Health of North Carolina, in response to a letter of inquiry, informs me that observation of the use of saw-dust for roadways in the city of Wilmington, N. C., where it is much employed, has convinced him that it is decidedly objectionable. He also called my attention to the report of the yellow fever in Norfolk in 1857, when the epidemic got its start in a portion of the city in which there was a large amount of "made ground," the foundation of which was saw-dust. The report calls especial attention to the extreme insalubrity of such land. It is very evident that if decomposing saw-dust is dangerous when buried beneath the surface, it must be ten-fold more harmful when openly exposed to the action of sun and rain, the foul gases generated from it being dispersed abroad, thus greatly extending the contamination.

Another source of danger from the decomposition of saw-dust is the contamination of water. Attention has already been called to the observation of the deleterious effects of decaying wood upon fish, and there can be no question but that water contaminated with the results of organic decomposition occasioned by the presence of saw-dust or wood in any other form in large quantities would be thereby rendered wholly unfit for drinking-purposes.

During the present season my attention has been called to another source of possible danger, viz., the contamination of ice. An institution with which I am professionally connected annually requires about three hundred tons of ice. Owing to a local scarcity of ice last Winter, nearly the whole of this year's supply was obtained from a lake at a distance of forty or fifty miles. Being absent from home at the time, I was unable personally to inspect the ice as usual, but was told by those who put it up that it seemed very clear and free from impurities. Upon beginning to use it, however, it was observed that when melted a copious deposit of fine dark particles appeared at the bottom of vessels containing it. Upon making a careful microscopical examination of these particles, I found them to be composed of partially decomposed saw-dust. The particles were so small that they were invisible until after the ice was melted, yet they were so abundant that a small piece of ice would produce a very copious deposit. The water obtained by melting the ice had at first no unpleasant taste nor odor, but upon standing soon became offensive. Immediately upon making the discovery I had coolers constructed which prevented the contact of the ice with the water cooled, fearing to risk the possible results of using the ice in the ordinary way. The very common notion that water will "freeze pure" is a mistaken one. If water is impure before being frozen, it will be likely to be impure in the form of ice. This is especially true of floating and suspended impurities. These are entangled in the ice, but are not rendered inert by the freezing process, and become as active for evil as ever when the ice is melted and the necessary degree of warmth is secured.

In view of the fact that saw-dust when left to decompose in large heaps, and especially when cast into small lakes, or streams, may in so many ways become a source of danger to human life and health, it is certainly evident that the matter is of sufficient importance to demand serious attention. The evil is constantly growing, in some parts of the country, particularly in lumbering districts, and has reached such a magnitude that measures ought to be speedily devised to secure its correction. Great difficulties present themselves as soon as the subject is broached, the chief of which grow out of the pecuniary interests of lumber manufacturers, which are supposed to demand that saw-dust and other refuse wood shall be disposed of in the quickest and most inexpensive manner possible, irrespective of any considerations relating to public health. It remains to be shown, however, that any person has any better right to keep upon his premises, in proximity to other human habitations, an immense heap of rotting wood, than an equal amount of decomposing matter of any other sort. In some parts the production of saw-dust is so enormous that appeals have been made to Congress to prohibit the practice of throwing it into navigable streams on account of the serious obstruction to navigation occasioned by the production of shoals. If the commercial and the sanitary interests in this matter could be united, it is quite possible that some practical method of abolishing or mitigating the evil might soon be devised and put into operation. The happiest solution of the problem possible would be effected by some discovery which would enable the producers of saw-dust to utilize it with pecuniary profit to themselves. If this could be accomplished, we should not be obliged to wait for tardy legislation on the subject, which can only be secured by the creation of a sufficiently strong popular sentiment in favor of prohibitory or restricting laws to demand the correction of the evil. Before this much-to-be-desired end can be attained, many more, and more accurate observations must be made by competent investigators; and in order to hasten the attainment of the more definite information needed, it is to be hoped that all who are interested in the advancement of sanitary science and the procurement of proper sanitary legislation will, so far as opportunity offers, give to this subject careful and critical attention. In the meantime those who believe themselves to be suffering from exposure to the evil described in this paper need not wait for special legislation on the subject, but carefully collect all the local evidences of injury directly or indirectly traceable to the suspected cause, and reinforcing these with the general facts relating to the subject which have been developed, appeal to the courts for redress in the same manner as for the abatement of any other nuisance.

JOHN H. KELLOGG.

Battle Creek, Michigan, 1880.

RELATIVE TO THE

DISEASES IN MICHIGAN DURING THE YEAR 1879;

INCLUDING

A SUMMARY FOR THE STATE,

AND THE REPLIES BY

CORRESPONDENTS OF THE STATE BOARD OF HEALTH,

To Circular No. 38, Issued by the Board.

◆

COMPILED IN THE OFFICE OF THE SECRETARY OF THE BOARD.

DISEASES IN MICHIGAN IN THE YEAR 1879.

The systematic study of the sickness and the coincident and antecedent meteorological and other conditions which may act as causes of sickness and deaths in this State, has occupied the attention of this Board for several years. For each of the years 1875, 1876, 1877, and 1878, a circular was prepared and sent to the correspondents of the Board, asking them to record and report their observations relative to this subject; and their replies were incorporated into articles in the Reports of this Board for 1876, 1877, 1878, and 1879. This branch of the study is here continued for the calendar year 1879. In February, 1880, Circular 38 was sent to the correspondents. It is similar to those issued before. One new question (20), relative to the influence of schools in spreading contagious diseases, was asked, and some questions relative to yellow fever appearing in the circular for 1878, were omitted, their peculiar interest at that time not being maintained for 1879. The questions in the circular are printed, in small type, on pages following, and for convenience in study a summary of the replies to each question immediately follows the question to which it relates. The summary is printed with type a little larger than is used for the questions. The replies to this circular, by the correspondents, are printed on pages immediately following the summary. Replies were received from 29 correspondents representing 28 localities. In a study of this character it is desirable that there should be available for comparison the compilations for as large a number of years as possible. That is one reason why the same questions are asked in each circular. The value of a systematic record of this kind can hardly be appreciated by one who has not tried to study the causation of some disease and found, as has always heretofore been the case, that it was impossible to ascertain the facts respecting any of the common diseases for any year except perhaps the current year, and for that year only vague impressions respecting a limited area. A systematic record of the prevalence of diseases and of coincident conditions must precede efforts for gaining a thorough knowledge of the conditions tending to the prevalence or absence of those diseases; and as conclusions cannot be reached from the evidence collected in any single year, the greatest value of such a record as it is designed to make in this article for each year is not apparent until after several years, and the value increases with the length of the series of years.

The value of a compilation of these replies for any given year depends on the pertinence of the questions, the accuracy of the replies, and the number of localities represented. It is believed that the replies in a fair degree accurately represent the facts asked about, and it is hoped that the replies to the circulars to be issued for future years will receive attention from a greater number of the correspondents. If a few observations were recorded during the year by each correspondent, the replies would be very accurate and very easily made. It is with pleasure that thanks are acknowledged to be due to those who have made such valuable replies for 1879. The circular and the summary are as follows:—

CIRCULAR TO CORRESPONDENTS, RELATIVE TO DISEASES IN MICHIGAN IN 1879.

[38.]

OFFICE OF THE STATE BOARD OF HEALTH,
LANSING, MICHIGAN, *February, 1880.*

To the Correspondents of the State Board of Health:

GENTLEMEN:—This Board desires to have, and to place upon record for purposes of future study in connection with records of deaths and of meteorological conditions, statements, for as many different localities in the State as possible, of the diseases in Michigan during the year 1879. Will you have the kindness to send, as soon as is convenient, your replies to the following questions? So far as exact and generally accepted common terms can be used, it is desirable to avoid the use of technical terms. Please use the stamped envelope enclosed herewith, and leave all additional postage to be paid at this office. In replying, it will not be necessary to repeat the questions, but simply to refer to the Circular, and to each question by number.

1. If you live in a city or incorporated village, what do you estimate the number of inhabitants of said city or village at the middle of the year 1879?
2. Among these inhabitants above mentioned, what do you estimate the number of deaths from all causes during the year 1879?

THE DEATH-RATE IN MICHIGAN, 1877-1879.

Questions 1 and 2 were asked with especial reference to cities and incorporated villages; but several replies were received from other localities. Replies were received to question 1, giving a known or estimated population for 27 of the 28 localities represented. Replies were received to question 2, giving a known or estimated number of deaths from 24 of the 28 localities. Replies to both these questions were received from five cities and eighteen villages, in many cases including adjacent territory. From these 23 localities having a total estimated population of 202,329, there were reported 3,272 deaths, an annual death-rate of 16.17. The highest death-rate reported was from the village of Webberville, Ingham Co., 33.33 per thousand inhabitants; the lowest death-rates reported were from the villages of Vernon and Port Sanilac, each being 3.33 per thousand. For 1878, 39 localities reported a total population of 285.867, with 3,749 deaths, an annual death-rate of 13.1 per thousand. For 1877, 28 localities reported a total population of 218,980, with 3,393 deaths, an annual death-rate of 15.5 per thousand. The average death-rate for the three years, 1877, 1878, and 1879, is 14.9. The highest death-rate reported for 1878 was 25 per thousand; the lowest, 3.7. The highest death-rate reported for 1877 was 40 per thousand; the lowest, 1 per thousand.

3. Please state the territory for which your replies to the following questions are made.

The 29 replies received to this circular, represent 8 cities, 16 incorporated villages, and 4 unincorporated villages. The villages nearly all include a portion of the country adjoining them. The territory represented is situated in 20 counties and in 6 of the 11 geographical divisions of the State. A list of these divisions, and of the counties included in each, is printed on page 227.

SICKNESS-RATE IN MICHIGAN, IN 1879 AND PREVIOUS YEARS.

4. Among the people of your locality, considering the increase or decrease of population, was the amount of *sickness* from all causes during the year ending December 31, 1879, *greater*, *less* or about *the same as the average* during previous years? If not the same, how much was it increased or diminished?

To this question 28 replies were received. Eleven correspondents stated that the amount of sickness from all causes during the year 1879 was less than the average for previous years; 9 stated that it was about the same as the average; 8 stated that it was increased or greater. Of the 11 who stated that it was less, 8 stated how much they thought it was less,—the range being from 7 per cent to fifty per cent, and the average decrease being 24.5 per cent; one reported that it was "less;" one, "less if anything;" one, "probably less." Of the 8 who stated that it was greater, 4 stated how much greater,—the range being from 25 per cent to 33⅓ per cent, and the average increase being 28 per cent; 1 stated that it was "a little greater;" 1, that it was "increased;" 1, that it was "somewhat greater;" and 1, that it was "slightly increased." In comparing the replies of correspondents to this question for 1879 with the replies to the same question for 1878, the same number (8) report an increase of sickness for both years, while the number of replies received for 1878 (46) was nearly twice the number received for 1879 (28); the average decrease of sickness in 1879 reported is 7.5 per cent less than in 1878, and the average increase reported is 1.75 per cent less than in 1878.

5. Compared with previous years, and from all causes, was the ratio of *deaths* to inhabitants during the year 1879, *greater*, *less*, or about *the same as the average?* If not the same, how much was it increased or diminished?

In reply to this question, 27 correspondents made statements. Ten stated that the ratio of deaths to inhabitants in 1879 was less than the average; 9 stated that it was about the same, or same as average; 8 stated that it was greater. Of the 10 who stated that it was less, 8 stated how much less they thought it was,—the range being from 2 per cent to 33⅓ per cent, and the average decrease being 22 per cent; one stated that it was "rather less," and one that it was "diminished." Of the 8 who stated it was greater, 4 stated how much it was increased; one stated that it was "increased 4 or 5 per 1,000 inhabitants;" one, that it was "49 more than in 1878," and in 1878 he reported 110 deaths; 1, that it was "20 per cent greater," and 1, "25 per cent greater." Of those who did not state the amount of increase, 1 stated that it was "greater;" 1, that it was "slightly increased;" 1, "that it was nearly an average, but greater;" and 1, that it was "above the average."

DISEASES MORE THAN USUALLY PREVALENT IN 1879.

6. What diseases, or causes of death, were *more* prevalent in 1879, than usual in previous years?

Twenty-eight correspondents replied to this question. Eleven stated that no disease was more prevalent in 1879 than in previous years. By the other 17 correspondents who replied to the question, the following diseases and causes of death were reported as more than usually prevalent during the year 1879:—

Diphtheria, by 8; measles and consumption each, by 4; pneumonia and scarlatina each, by 2; accidents, agues, bilious troubles, bowel complaints, bronchitis, cancer, croup, neuralgia, mumps, tonsilitis, diseases of the respiratory organs, throat, heart, and brain, and "pulmonary diseases in general," each, by 1.

In the replies to this question for 1878, 15 correspondents reported diphtheria as a disease of increased prevalence. In 1877, 6 correspondents reported it as a disease of increased prevalence. In 1877 and 1878, 6 correspondents reported scarlet fever to be increased in prevalence. A tabular view of abstracts from the replies to question 6 is given in Exhibit 2 on page 228–9.

CAUSES OF ANY UNUSUAL SICKNESS IN 1879.

7. If you can assign any *cause for* the *unusual prevalence* of any disease, please do so.

Thirteen replies were received to this question, a tabular abstract from which is given in Exhibit 2, pages 228–9.

DISEASES LESS THAN USUALLY PREVALENT IN 1879, AND CAUSES THEREOF.

8. What diseases, or causes of death, were *less* prevalent in 1879, than usual in previous years?

Twenty-four correspondents replied to this question. Eight stated that there was no disease of less than usual prevalence. One, that there was "no epidemic;" and one, that there was an "absence of malignant contagious diseases of severe type." Of the fourteen who reported some disease or diseases of lessened prevalence,—typhoid fever and scarlatina were reported as of lessened prevalence, by 4; small-pox, bowel complaints, typho-malarial fever, fevers, and diphtheria, each by 2; malarial diseases, by 3; dysentery, consumption, chicken-pox, and acute pulmonary diseases, each by 1.

Of the two who reported diphtheria as lessened in prevalence, one reports "a few cases," and the other "not over 12." A tabular abstract from the replies to question 8 is given in Exhibit 2, pages 228–9.

9. To what do you attribute the lessened prevalence?

Fifteen replies were received to this question, a tabular abstract from which may be found in Exhibit 2, pages 228–9.

DISEASES RESULTING IN MORE DEATHS IN 1879 THAN USUAL, AND CAUSES THEREOF.

10. From what diseases or causes was there *more* than the usual mortality during the year 1879?

Twenty-seven replies were received to this question. Fourteen stated that from no disease was there increased mortality. By the other thirteen correspondents the mortality from the following diseases was reported to be greater in 1879 than usual:—

From diphtheria, by 6; consumption, by 5; cancer, by 2; croup, debility, measles, paralysis, pneumonia, pulmonary disorders, puerperal fever, scarlatina, heart diseases from neuralgia and rheumatism, each by 1.

An abstract from the replies to question 10 is given in Exhibit 3, page 230.

11. If you can assign any *cause for* the *unusual mortality* from any disease, please do so.

Seven replies were received to this question, a tabular abstract from which is given in Exhibit 3, on page 230.

EXHIBIT 1.—*Eleven Geographical Divisions of the State, formed for the purpose of facilitating the Study of Causes of Sickness and of Deaths, with a List of Counties included in each Division.*

Upper-Peninsular.	North-western.	Northern.	North-eastern.	Western.	Northern-Central.	Bay and Eastern.	Central.	South-western.	Southern-Central.	South-eastern.
Baraga.	Benzie.	Antrim.	Alcona.	Kent.	Clare.	Bay.	Barry.	Allegan.	Branch.	Macomb.
Chippewa.	Gr. Traverse.	Charlevoix.	Alpena.	Lake.	Gladwin.	Huron.	Clinton.	Berrien.	Calhoun.	Monroe.
Delta.	Leelanaw.	Cheboygan.	Iosco.	Mason.	Isabella.	Lapeer.	Eaton.	Cass.	Hillsdale.	Oakland.
Houghton.	Manistee.	Crawford.	Montmorency*.	Muskegon.	Mecosta.	Saginaw.	Genesee.	Van Buren.	Jackson.	Wayne.
Isle Royal.	Maniton.	Emmet.	Ogemaw.	Newaygo.	Midland.	Sanilac.	Gratiot.		Kalamazoo.	
Keweenaw.	Missaukee.	Kalkaska.	Oscoda.†	Oceana.	Roscommon.	St. Clair.	Ingham.		Lenawee.	
Mackinac.	Wexford.	Otsego.	Presque Isle.	Osceola.		Tuscola.	Ionia.		St. Joseph.	
Marquette.				Ottawa.			Livingston.		Washtenaw.	
Menominee.							Montcalm.			
Ontonagon.							Shiawassee.			
Schoolcraft.										

* Unorganized, attached to Alpena. † Unorganized, attached to Alcona.

The replies by correspondents are grouped by geographical divisions of the State, shown in this exhibit, and alphabetically by localities within the divisions. This exhibit is printed here in order to aid in turning to replies from particular localities, without referring to the index, and that reference may readily be made to it by page, from the exhibits which follow.

The weekly reports of diseases for the year 1879, ending January 3, 1880, and the records of meteorological conditions in 1879, the compilations of which are printed in this volume, are also compiled with reference to these geographical divisions.

EXHIBIT 2.—*Indicating by Geographical Divisions of the State, and by Localities, the Diseases of Increased and of Lessened Prevalence in Michigan during the Year 1879, and the Supposed Causes of Increased and of Lessened Prevalence,—as Compiled from the Replies of 28 Correspondents to Questions 6, 7, 8, and 9, of Circular 38 from the State Board of Health.*

Divisions* and Localities.	Diseases of Increased Prevalence.	Supposed Causes of Increased Prevalence.	Diseases of Lessened Prevalence.	Supposed Causes of Lessened Prevalence.
All Localities.	See Summary of Replies to Question 6, pages 225-226.		See Summary of Replies to Question 8, page 226.	
WESTERN DIVISION.*				
Cedar Springs	Consumption		Absence of malignant contagious diseases of severe type.	In large degree to enforcement of sanitary measures.
Grand Rapids	Diphtheria, measles, mumps.			
BAY AND EASTERN.*				
Bay City	Diphtheria, croup, and tonsilitis.	Were not epidemic but sporadic over the city.	Small-pox and scarlet fever	Improvements in city and lack of contagion.
Lapeer	Diphtheria		Continued fevers and dysentery	Better drainage of the towns, especially Mayfield.
Port Sanilac	Measles	No reason to assign	Typhoid fever and consumpt'n.	No special cause to assign.
Saginaw City	Diphtheria, consumption, and bowel complaints.	Cannot say, except the usual origin.		
Zilwaukee	No one disease	Scarlet fever caused by importation.	Bowel complaints	Lower temperature.
CENTRAL.*				
De Witt	Diphtheria	Contagion	None in particular.	
Hastings	Nothing unusual		Nothing unusual.	
Hubbardston	None.			
Muir	Cancer		No epidemic	Uniform temperature.
St. Johns	Accidents and consumption.			
Vernon	None		Less malarial troubles	Better drainage and better dwellings.
Webberville	Diphtheria	Clearing new land, ditching and draining are sources of disease, until marshes and new land are thoroughly subdued.	None.	
SOUTH-WESTERN.*				
Otsego	Diphtheria	More persons of a susceptible age.	None.	
Pokagon	None		None.	
SOUTHERN-CENTRAL.*				
Centerville	Diphtheria	Drying up of a millrace and millpond.	Low grades of fever, as typhoid and typho-malarial.	Accidental. Better hygienic conditions in homes.
Hillsdale	Bilious troubles; half-fledged agues; but few serious cases.	Greater humidity of atmosphere; extreme heat.	Scarlatina and diphtheria	Absence of contagion.
Hudson	Pneumonia and pulmonary diseases in general.	Unusual and rapid changes in the temperature.	Bowel diseases, scarlatina, and diphtheria.	
Mendon	None		Malarial	Continued drainage and exhaustion of vegetable matter in the soil.
Tecumseh	Scarlatina	Contagion	Typhoid fever	Better sanitation.

Three Rivers	None		Malarial	Favorable meteorological changes and dry seasons.
Union City	None		Typho-malarial fever	Improved drainage and clearing of land
Vicksburg	None		Nothing unusual.	
SOUTH-EASTERN.*				
Detroit[1]	Same		Same.	
Detroit[2]	Diseases of the throat, respiratory organs, heart, and brain, measles, consumption, pneumonia, bronchitis, neuralgia.	Not able to determine cause of "throat" disease which has been prevalent since the great epizootic among horses in 1872. Measles has not been prevalent for several years.	Scarlatina, small-pox, chicken-pox, and fevers.	Lack of material in scarlet fever, vaccination in small-pox, and better water in typhoid fever.
Plymouth	None		Typho types and acute pulmonary diseases.	None apparent.
Wyandotte	Scarlet fever in Spring and beginning of Summer; measles in Fall and Winter.	In measles, more persons susceptible because disease has not occurred for several years.	None.	

* For counties in each division, see Exhibit 1, page 227. [1] Judson Bradley, M. D. [2] W. H. Rouse, M. D.

The summary of replies to question 6, on pages 225–6, to question 10, on page 230, and to question 20, in Exhibit 4 on following pages, emphasizes what has already been said, in previous Reports and in circulars by the State Board of Health, concerning the ravages of diphtheria and scarlet fever in various parts of the State, and the necessity for prompt, thorough, and efficient measures for their extermination. Every year they extend their territory, which they seldom abandon entirely. Until they are fought by local boards of health as energetically as are small-pox and cholera, we shall see them continue to slay the fairest and the best, some years, indeed, in greater, some in less numbers, but always and nearly everywhere ready to attack their victims where any are found of susceptible age and constitution.

EXHIBIT 3.—*Indicating, by Localities in Michigan, the Diseases from which there was Increased Mortality, the Diseases from which there was Lessened Mortality, during the Year 1879, and the Supposed Causes of Increased and of Lessened Mortality,—as compiled from the Replies of 27 Correspondents to Questions 10, 11, 12, and 13, in Circular 38 from the State Board of Health.*

Divisions* and Localities.	Diseases of Increased Mortality.	Supposed Causes of Increased Mortality.	Diseases of Lessened Mortality.	Supposed Causes of Lessened Mortality.
All Localities.	See Summary of Replies to Question 10, page 226.		See Summary of Replies to Question 12, page 231.	
WESTERN DIVISION.*				
Cedar Springs	Consumption	No special cause	Prevailing diseases less violent.	No severe epidemic.
Grand Rapids	Diphtheria.			
BAY AND EASTERN.*				
Bay City	Consumption and cancer		Very few fatal cases of fever and scarlet fever.	Less miasmatic impression.
Lapeer	None		Dysentery and pneumonia.	
Port Sanilac	Measles	Want of medical attendance and proper care.		
Saginaw City	Pneumonia, diphtheria, consumption, and heart dis. from neuralgia, rheumatism, etc.			
Zilwaukee	No unusual mortality		Bowel troubles	Less diseases of the bowels.
CENTRAL.*				
De Witt	Diphtheria and paralysis.			
Hastings	No unusual mortality.			
Muir	Cancer		None.	
St. Johns	Consumption	Greater extremes of temperature and humidity.		
Vernon	None		Scarlatina, measles, whooping-cough, fevers, etc.	No epidemics.
Webberville	Diphtheria	Malignant type of diphtheria	None.	
SOUTH-WESTERN.*				
Otsego	Diphtheria	More susceptible persons	None.	
Pokagon	None.			
SOUTHERN-CENTRAL.*				
Centerville	None		Diphtheria	Mildness of the epidemic.
Hillsdale	None		Contagious diseases	Absence of contagious diseases.
Hudson	Pulmonary disorders	Unusual and rapid changes in the temperature.		
Mendon	None		None, except malarial.	
Tecumseh	Scarlatina		Typhoid and typho-mal. fever	Better sanitation and fewer cases.
Three Rivers	None		Malarial	Favorable meteorological changes, and dry seasons.
Union City	None		Typho-malarial fever	Improved drainage and clearing of land.
Vicksburg	None		None.	
SOUTH-EASTERN.*				
Detroit[1]	Same		Same.	
Detroit[2]	Consumption, diphtheria, croup, puerperal fever, and debility.	In consumption, possibly humidity is related to it in some way. See Table A, page †.	Scarlet fever, typhoid fever, pneumonia, and whooping-cough.	Scarlet fever and whooping-cough, lack of fresh material, typhoid fever, better water.
Northville	None		Acute pulmonary diseases, typho-mal. fever, and diphtheria.	Immunity from dangerous forms of disease.
Wyandotte	None		Cholera-infantum and infantile diarrhea.	Lessened prevalence.

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* For counties in each division, see Exhibit 1, page 227.

† In replies by Dr. Rouse.

[1] Judson Bradley, M. D.

[2] W. H. Rouse, M. D.

DISEASES RESULTING IN LESS DEATHS IN 1879 THAN USUAL, AND CAUSES THEREOF.

12. From what diseases or causes was there *less* than the usual mortality?

Nineteen replies were received to this question. Five stated that there was no disease of lessened mortality in 1879; the diseases from which there was a lessened mortality reported in 1879 are as follows:

From scarlatina, and typho-malarial fever, each by 3 correspondents; diphtheria, fevers, malarial diseases, pneumonia, typhoid fever, and whooping-cough, each by 2; bowel troubles, cholera infantum, contagious diseases, dysentery, infantile diarrhea, measles and acute pulmonary diseases, each by 1.

A tabular abstract from the replies to this question is given in Exhibit 3, on page 230.

13. To what do you attribute the lessened mortality?

Thirteen replies were received to this question, a tabular abstract from which may be found in Exhibit 3, on page 230.

DISEASES ATTENDED WITH AN UNUSUALLY HIGH OR LOW RATE OF MORTALITY, WITH TIMES OF OCCURRENCE IN 1879.

14. Please give names, and mention dates of the occurrence in 1879, of any and all diseases attended with an *unusually high rate of mortality.*

In reply to this question thirteen correspondents stated that no disease was attended with unusually high rate of mortality in 1879; six made no statement; two placed a cipher as an answer to the question. The following diseases were reported as having been attended with an unusually high rate of mortality:—

Diphtheria, by 4 correspondents, in January and February, with small per cent of deaths, and in March and April with large per cent of deaths, by 1; "little choice of seasons," by 1; in August, September, October, November, and December, by 1; and in May, June, July, August, September, March, and April, by 1. Measles in January, February, and March, by 1; consumption, no time stated, by 1. Malaria and improper food in hot months, and lung troubles in winter and spring months, by 1. Paralysis in February and March, by 1. Pulmonary diseases most prevalent in winter and fall months, whooping-cough during Summer and Fall, by 1.

15. Please give names, and mention dates of the occurrence in 1879, of any and all diseases attended with an *unusally low rate of mortality.*

Fourteen replies were received to this question. Seven correspondents stated that no disease was attended with an unusually low rate of mortatity during 1879; 1 that there was no time when the death-rate was noticeable for variation from the average. The following diseases are given by the remaining correspondents who replied to the circular as having been attended with an unusually low rate of mortality:—

Whooping-cough, no time stated, by 1. Diphtheria from August 10 to December 20, by 1. In Fall a few cases severe fevers, few typho-malarial fevers, deaths, except invalids and old people, almost none; in Winter and Spring a few cases of pneumonia, few deaths, by 1. Pulmonary diseases most prevalent in Winter and Fall months, whooping-cough during Summer and Fall, by 1. Scarlatina in Spring and Summer, measles in Fall and Winter, by 1.

DISEASES IN 1879 NOT USUAL IN THE LOCALITY.

16. Please give names, and mention dates of the occurrence in 1879, of any and all *diseases not usually occurring in your locality.*

In reply to the question 14 correspondents stated that there was no disease in their locality in 1879 not usually prevalent there. The following diseases are reported to have been present in localities where they did not usually occur:

Diphtheria, in March, April, and May, by 1 correspondent; in June, by 2; July, by 2; August, by 3; September, by 3; in October, by 2; November, by 2; December, by 2; "in winter and spring months," by 1; "in latter part of year," by 1. Whooping-cough in April, by one; in August and September, by 1. Measles in March and December, each by 1. Scarlatina in January, typhoid fever in September, October, and December, puerperal fever in January, and November, erysipelas and dropsy in January, apoplexy and paralysis in February, March, April, May, and June, Bright's disease in February, March, and April, membranous croup in April and December, tape worm in April, erythema nodosum in May, June, and July,—by 1. "Ship fever," by 1, no time stated. One stated, "have had a little of every disease except small-pox." Two correspondents placed a cipher opposite this question.

COMMUNICABLE DISEASES, IN 1879.

17. State number of cases of each of these diseases; namely, small-pox, cholera scarlet fever, typhoid fever, measles, whooping-cough, cerebro-spinal meningitis, diphtheria, and any other epidemic, endemic, contagious, or infectious disease that appeared during 1879. (Facts are especially desired, but opinions are better than no statements, though it will be well to state them as opinions).

18. Of the eight diseases mentioned in question 17, *name those of which no case appeared* during the year 1879.

Of the 29 correspondents who replied to the circular, 6 made no reply to question 17, and 1 made no reply to question 18. One, in reply to question 17, said that none of the diseases named prevailed as an epidemic. The statements concerning the diseases named in these questions are summarized as follows:—

Small-pox.—No well-authenticated case of small-pox was reported; 28 correspondents stated that no case occurred in their localities in 1879; 1 made no reply.

Cholera.—One "case said to be cholera" was reported by 1 correspondent. It was doubted by the correspondent; 27 correspondents reported no case as occurring in their locality in 1879. One did not reply.

Scarlet fever.—In regard to this disease 13 correspondents reported it present, and 6 reported no case in 1879, 9 did not reply regarding this disease. The number of cases reported by 8 correspondents is 93, ranging from 1 to 33. Two reported a "few cases;" 1, "some;" and one a little; and one, that it was very prevalent for several months; 1 reported 81 deaths.

Typhoid fever.—In regard to this disease, 10 correspondents reported it present, and 9 reported no case of it present during the year 1879; 9 did not reply regarding this disease. Eight correspondents reported in all 42 cases, ranging from 1 to 10. One reported a "little," and 1 reported the disease as more than usually prevalent in the Fall. One reported 25 deaths from this disease.

Measles.—In regard to this disease 8 reported the disease as present, and 12 reported it not present during the year 1879. Nine did not reply concerning this disease. Three correspondents report a total of 59 cases. One stated that cases were "numerous;" 2, that there were a few cases; 1, that there was "an epidemic;" 1, that it was "more prevalent than ever before."

Whooping-cough.—Concerning this disease 14 correspondents reported it present during the year; 5 reported it as not present during the year, and 9 made no reply. Six correspondents reported 612 cases, ranging from 5 to 350; 4 reported "a few cases;" 1, that there were many cases; 1, that it was more prevalent than usual; 1, that it was very prevalent; and 1, that there was one death.

Cerebro-Spinal Meningitis.—Concerning this disease, 1 correspondent reported two cases; 1 reported twelve deaths; 9 reported no case, and 8 did not reply.

Diphtheria.—Seventeen correspondents reported this disease present in their localities, 4 reported no case in 1879, and 7 did not reply. Fourteen correspondents reported 440 cases ranging from 1 to 150 cases, by one observer. One reported "several, none fatal;" 1, "a few;" and 1, stated that the disease was "more than usually prevalent in Fall and Winter." One reported 94 deaths from this disease.

One correspondent stated that the cases of whooping-cough and diphtheria were not all reported and he could not answer correctly. One correspondent reported 2 cases each of erysipelas and puerperal fever. One correspondent reported "4 or 5 cases of typho-malarial fever."

SPREAD OF DISEASES BY PUBLIC SCHOOLS.

19. Has attendance on the public schools in your neighborhood in 1879 spread any of the diseases mentioned in question 17?

Twenty-seven of the 29 correspondents replying to the circular, made statement in reply to this question. Thirteen stated that attendance on the public schools did not spread any of the diseases mentioned. Fourteen reported that it did spread some of those diseases, and 13 of them stated the disease. By them the following diseases are reported to have been spread by attendance on the public schools:—

Diphtheria, reported by 4; measles, by 5, and by 1 of them "very extensively;" whooping-cough, by 9; scarlet fever, by 6, and by one of them "to a limited extent;" mumps, by 1.

DISEASES MOST PREVALENT IN EACH MONTH, 1879.

20. For each of the months in 1879, please give a summary statement of the diseases which occurred, naming them in the order of their prevalence,—greatest first.

In reply to this question, 13 correspondents who replied to the circular, made no statement; 1 made no statement for August and October; 1 made no statement for April, May, June, and July; 1 replied concerning two diseases only, intermittent fever and whooping-cough, and for the latter for 3 months, August, September, and October; 1 said for June, July, November, and December, "almost nothing;" for August, September, and October, "a good deal of bilious trouble but little severe sickness;" 1 replied for scarlatina, diphtheria, mumps, and typhoid fever, only. A tabular summary of the replies to this question is shown in Exhibit 4, pages 234-235. This exhibit includes also summaries of the replies by 32 correspondents to the same question in Circular 29, for the year 1878, by 18 correspondents to the same question in Circular 24, relative to the diseases in 1877, by 46 correspondents to the same question in Circular 15, relative to the diseases in 1876, and by 8 correspondents to the same question in Circular 11, relative to the diseases in

EXHIBIT 4.—*Stating by Months the Number of Correspondents who Reported Cases of certain Diseases in reply to Circulars 11, 15, 24, 29, and 38, Relative to Diseases in Michigan in the Years 1875, 1876, 1877, 1878, and 1879*.—(See Question 20 of Circular 38, on page 233, and the paragraphs which follow it).*

NUMBER OF CORRESPONDENTS REPORTING CASES OF DISEASES NAMED IN REPLY TO CIRCULARS 11, 15, 24, 29, AND 38,—FOR THE YEARS 1875, 1876, 1877, 1878, AND 1879.

JANUARY.	1875.*	1876.*	1877.*	1878.*	1879.*	FEBRUARY.	1875.*	1876.*	1877.*	1878.*	1879.*	MARCH.	1875.*	1876.*	1877.*	1878.*	1879.*
Rheumatism	4	8	7	15	9	Pneumonia	5	8	12	15	12	Rheumatism	2	5	8	16	12
Intermittent fever	1	1	3	15	9	Bronchitis	2	6	12	22	11	Bronchitis	..	7	12	19	11
Bronchitis	2	5	13	20	8	Rheumatism	4	7	7	14	9	Pneumonia	5	10	10	19	10
Consumption	..	1	7	13	8	Intermittent fever	1	3	5	15	8	Intermittent fever	1	3	8	19	9
Pneumonia	8	7	10	14	7	Influenza	..	..	9	14	8	Neuralgia	..	..	1	2	9
Tonsilitis	..	1	..	2	7	Consumption	1	1	5	13	7	Influenza	..	..	7	12	8
Neuralgia	..	1	..	1	7	Neuralgia	..	..	..	2	7	Tonsilitis	..	1	..	2	7
Influenza	..	..	8	13	6	Tonsilitis	..	..	..	2	6	Consumption	1	..	7	16	6
Diphtheria	2	5	9	11	6	Diphtheria	3	4	8	7	4	Remittent fever	2	..	5	12	5
Scarlet fever	3	5	3	8	5	Remittent fever	2	..	6	9	3	Diphtheria	..	2	6	8	5
Remittent fever	2	..	7	9	4	Scarlet fever	3	6	3	9	3	Scarlet fever	3	6	5	10	3
Diarrhea	..	1	2	4	2	Diarrhea	..	1	2	4	2	Puerperal fever	..	..	2	..	3
Whooping-cough	..	..	3	3	2	Measles	2	2	2	2	1	Erysipelas	..	..	2	1	2
Erysipelas	1	2	3	1	2	Typhoid fever	..	2	..	2	1	Mumps	1	..	2	2	2
Typhoid fever	..	2	1	1	2	Dysentery	..	..	..	2	1	Croup	..	1	..	2	[b]2
Puerperal fever	..	..	1	3	1	Cholera morbus	..	..	..	2	1	Whooping-cough	1	3	3	2	1
Typho-mal. fever	1	..	2	6	..	Croup	..	1	..	2	[a]1	Measles	3	..	3	1	1
Dyspepsia	..	..	..	3	..	Pharyngitis	..	1	2	1	1	Cerebro-spi. men.	..	2	1	[c]2	1
Measles	1	2	1	2	1	Erysipelas	3	..	1	3	1	Diarrhea	..	1	1	5	1
Sore-throat	..	..	..	2	..	Whooping-cough	..	2	2	3	1	Typhoid fever	..	1	1	2	1
Typhoid-pneumo.	2	..	..	..	..	Typho-mal. fever	1	..	1	3	..	Typho-mal. fever	..	..	1	4	..
Pleurisy	2	..	..	1	..	Dyspepsia	..	..	..	3	..	Pharyngitis	.	..	1	2	..
Mumps	..	..	1	..	1	Sore-throat	1	..	..	2	..	Dyspepsia	..	..	..	2	..
Membran. croup	..	..	..	1	1	Cerebro-spi. men.	..	..	2	1	..	Asthma	..	..	2	..	..
Pharyngitis	..	..	..	1	1	Catarrhal diseases	..	3	..	..	..	Dropsy	..	2	1	..	..
Bright's disease	..	1	..	..	1	Peritonitis	2	..	..	..	..	Rheumatic fever	3	..	..	..	..
Dropsy	..	1	1	..	1	Malarial fever	2	..	..	..	..						
APRIL.						MAY.						JUNE.					
Intermittent fever	4	3	11	26	11	Intermittent fever	4	5	13	26	10	Intermittent fever	4	6	14	24	11
Rheumatism	2	2	11	16	11	Consumption	..	1	8	15	8	Consumption	..	1	6	12	9
Bronchitis	2	5	10	21	9	Bronchitis	.	2	8	15	7	Remittent fever	1	4	12	9	9
Consumption	2	1	8	13	9	Rheumatism	..	2	10	11	7	Rheumatism	..	2	7	13	7
Neuralgia	..	1	..	2	8	Remittent fever	1	2	9	10	7	Bronchitis	1	2	5	11	7
Influenza	..	..	4	10	7	Neuralgia	..	..	..	..	7	Neuralgia	..	..	..	1	5
Diphtheria	1	1	3	5	6	Diphtheria	..	2	6	4	5	Diarrhea	1	2	3	8	4
Tonsilitis	..	..	1	2	6	Tonsilitis	..	..	..	..	5	Tonsilitis	..	..	..	1	4
Remittent fever	1	1	3	10	5	Pneumonia	2	3	8	9	4	Influenza	..	..	4	10	3
Scarlet fever	3	6	5	8	5	Influenza	..	..	5	8	4	Pneumonia	..	2	6	8	3
Pneumonia	4	7	8	14	4	Scarlet fever	2	2	5	4	4	Scarlet fever	1	2	4	6	3
Diarrhea	..	1	3	5	2	Whooping-cough	1	4	2	2	3	Measles	1	2	2	1	3
Puerperal fever	..	1	2	2	2	Diarrhea	..	1	3	8	2	Diphtheria	..	1	4	6	2
Typhoid fever	..	1	2	..	2	Erysipelas	1	1	3	5	2	Mumps	..	..	..	..	2
Mumps	1	..	2	..	2	Mumps	..	..	..	1	2	Whooping-cough	1	5	3	5	1
Erysipelas	..	1	4	6	1	Typhoid fever	..	1	1	2	1	Erysipelas	1	..	2	3	1
Typho-mal. fever	..	..	..	4	1	Dysentery	..	1	..	2	..	Typhoid fever	..	2	2	3	1
Whooping-cough	..	2	..	2	1	Typho-mal. fever	..	..	1	2	..	Cholera morbus	..	..	5	2	1
Dysentery	..	1	2	1	1	Measles	1	1	3	1	..	Typho-mal. fever	..	1	2	5	..
Catarrhal diseases	..	2	1	..	1	Puerperal fever	..	1	2	..	..	Dysentery	..	1	2	4	..
Croup	..	1	..	3	[a]1	Cerebro-spi. men.	..	4	..	1	..	Cholera infantum	..	2	2	1	..
Pharyngitis	..	..	1	3	..	Asthma	..	2	..	1	..	Dropsy	..	1	2	..	..
Measles	2	2	2	1	..												

* Eight correspondents replied to this question in the Circular for 1875; 46, for 1876; 18, for 1877; 32, for 1878; and 16, for 1879.

For comments on this Exhibit, see paragraph 20, and following paragraphs, pages 233–5.

[a] Membraneous croup.
[b] Includes one "membraneous croup."
[c] "Meningitis."

1875. Except for the month of January, no disease is included in the statement for any month, which was not reported for that month by more than one correspondent in one of these years. In studying this exhibit, it is necessary to bear in mind the number of correspondents who replied to the question for each year; these numbers are stated in a foot-note to the exhibit.

EXHIBIT 4.—CONTINUED.—*Diseases in Michigan in 1879.*

NUMBER OF CORRESPONDENTS REPORTING CASES OF DISEASES NAMED, IN REPLY TO CIRCULARS 11, 15, 24, 29, AND 38.

JULY.	1875.*	1876.*	1877.*	1878.*	1879.*
Intermittent fever	4	6	13	25	11
Diarrhea	2	4	12	18	9
Remittent fever	3	6	10	16	8
Consumption	--	1	6	13	7
Rheumatism	1	1	5	9	7
Diphtheria	1	3	4	5	5
Scarlet fever	1	3	4	3	5
Neuralgia	--	--	--	--	5
Tonsilitis	--	--	--	1	5
Bronchitis	--	--	6	9	4
Influenza	--	--	1	8	4
Cholera morbus	--	--	8	6	4
Dysentery	--	4	4	4	3
Erysipelas	2	2	2	3	3
Whooping-cough	--	2	4	7	2
Cholera infantum	--	2	4	3	2
Pneumonia	--	3	2	5	1
Sunstroke	--	--	--	2	1
Measles	1	1	2	--	1
Typhoid fever	1	2	1	1	1
Dropsy	--	1	2	--	1
Eczema	--	--	--	2	1
Typho-mal. fever	--	1	3	--	--

AUGUST.	1875.*	1876.*	1877.*	1878.*	1879.*
Intermittent fever	4	8	14	27	13
Diarrhea	2	8	11	25	11
Remittent fever	3	5	10	21	10
Consumption	--	1	5	11	7
Diphtheria	--	2	3	6	6
Dysentery	4	5	12	12	5
Rheumatism	--	2	4	6	5
Bronchitis	--	4	5	12	4
Cholera morbus	--	2	9	7	4
Scarlet fever	1	2	4	2	4
Influenza	--	--	--	4	4
Tonsilitis	--	--	--	3	4
Neuralgia	--	1	--	1	4
Cholera infantum	--	4	9	9	3
Whooping-cough	--	4	4	7	3
Pneumonia	1	3	1	5	3
Erysipelas	1	--	2	3	2
Typhoid fever	2	5	2	5	1
Puerperal fever	--	--	1	2	1
Dropsy	--	1	2	--	1
Typho-mal. fever	3	2	3	3	--
Measles	2	--	--	2	2
Bilious fever	2	--	--	--	--

SEPTEMBER.	1875.*	1876.*	1877.*	1878.*	1879.*
Intermittent fever	2	9	16	24	12
Diarrhea	2	9	14	22	12
Remittent fever	2	5	10	20	10
Dysentery	6	5	12	17	6
Bronchitis	--	1	3	11	6
Consumption	--	1	5	12	6
Diphtheria	1	1	3	7	6
Rheumatism	--	2	6	10	5
Tonsilitis	--	--	--	1	5
Neuralgia	--	--	--	1	5
Influenza	--	3	2	9	4
Typhoid fever	3	3	4	3	4
Typho-mal. fever	4	4	5	10	2
Erysipelas	--	1	2	6	2
Cholera infantum	--	5	6	4	2
Cholera morbus	--	1	5	4	2
Pneumonia	--	2	1	4	2
Measles	2	--	--	1	2
Whooping-cough	--	4	1	7	1
Scarlet fever	1	--	4	3	1
Croup	--	2	--	--	--
Bilious remit. fever	2	--	--	1	--
Bilious fever	2	--	--	--	--
Malarial fever	2	1	1	--	--
Dropsy	--	1	2	--	1

OCTOBER.	1875.*	1876.*	1877.*	1878.*	1879.*
Intermittent fever	2	9	15	24	13
Remittent fever	4	5	13	19	10
Diarrhea	1	3	9	12	10
Diphtheria	1	--	6	12	8
Bronchitis	--	4	5	15	7
Consumption	--	3	6	14	7
Rheumatism	--	1	5	10	7
Tonsilitis	--	--	--	4	6
Neuralgia	--	1	1	3	5
Dysentery	5	2	6	10	4
Typhoid fever	4	2	3	6	4
Influenza	--	2	6	12	3
Scarlet fever	1	2	5	5	3
Erysipelas	1	2	1	5	2
Pneumonia	1	3	2	2	2
Cholera morbus	--	--	1	2	2
Measles	--	3	--	1	2
Typho-mal. fever	5	2	6	11	1
Whooping-cough	1	3	3	9	1
Croup	--	2	--	1	[a]1
Puerperal fever	[b]1	1	--	2	--
Cholera infantum	1	1	3	1	--
Asthma	--	1	2	--	--
Dropsy	--	1	2	--	1
Pharyngitis	--	--	2	--	--
Bilious fever	--	2	--	--	--

NOVEMBER.	1875.*	1876.*	1877.*	1878.*	1879.*
Intermittent fever	2	8	14	21	12
Rheumatism	--	4	11	12	8
Bronchitis	1	3	9	19	7
Consumption	--	2	7	16	7
Diphtheria	--	2	9	15	7
Neuralgia	1	--	1	7	7
Tonsilitis	--	--	--	5	7
Remittent fever	3	3	12	14	6
Pneumonia	3	7	3	11	5
Influenza	--	2	4	11	4
Typhoid fever	--	2	4	4	3
Diarrhea	1	--	7	8	3
Erysipelas	1	3	1	4	3
Measles	4	1	--	2	3
Typho-mal. fever	2	1	7	8	2
Scarlet fever	3	2	5	6	2
Croup	--	1	--	2	[c]3
Dysentery	--	--	3	3	1
Whooping-cough	2	4	4	12	1
Pharyngitis	--	--	1	2	1
Inflam. of liver	--	--	--	2	--
Cerebro-spi. men	3	1	--	1	--
Pleurisy	--	--	2	1	--
Inflam. of bowels	--	--	--	--	2

DECEMBER.	1875.*	1876.*	1877.*	1878.*	1879.*
Intermittent fever	1	5	14	14	11
Diphtheria	3	6	9	17	9
Rheumatism	1	3	8	16	9
Bronchitis	2	9	9	22	8
Remittent fever	--	2	10	7	8
Neuralgia	1	1	--	6	7
Pneumonia	1	7	7	16	6
Influenza	--	3	4	18	6
Consumption	--	2	6	13	6
Measles	2	--	--	2	5
Tonsilitis	--	1	--	8	4
Diarrhea	--	1	1	2	4
Scarlet fever	3	3	5	6	3
Whooping-cough	2	5	4	11	2
Erysipelas	--	1	--	5	1
Croup, mem.	--	--	--	3	1
Typhoid fever	--	3	2	2	1
Dysentery	--	1	2	2	1
Pharyngitis	--	--	1	2	1
Typho-mal. fev.	1	--	5	4	--
Croup	1	2	--	3	--
Asthma	--	1	2	--	--
Abortion	--	--	2	--	--

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* Eight correspondents replied to this question in the Circular for 1875; 46, for 1876; 18, for 1877; 32, for 1878; and 16, for 1879.

[a] Membraneous croup. [b] Puerperal peritonitis. [c] Includes one membraneous croup.

DISEASES WHICH CAUSED MOST SICKNESS IN 1879, AND PREVIOUS YEARS

In Exhibit 4, on pages 234 and 235, the names of the diseases are arranged for each month according to the number of correspondents who reported them present in that month in 1879. So far as these numbers differ then, and so far as the localities concerning which statements were made represented the State, the order in which the names of the diseases are arranged is an indication of the area of prevalence and thus of the order of prevalence of these diseases in 1879.

The disease which heads the list for any month was then, according to the evidence presented in Exhibit 4, the most widespread disease for that month, and probably the disease which caused the most sickness in this State during that month.

It is probable that the greater number of correspondents reporting neuralgia and tonsilitis in 1879 and in the last three months of 1878, as compared with previous years, is due in part to the fact that the attention of observers was especially called to these diseases in October, 1878, when for the first time these diseases were printed on the postal-card blanks used for weekly reports of diseases.

A noticeable fact in Exhibit 4 is the prominence of intermittent fever, as it heads the list in nine months of the year, and is only fourth in the list for any month. With diarrhea and remittent fever in July, August, and September, and rheumatism, bronchitis, pneumonia, and consumption, in other months of the year, it presents year after year an array of sickness, of frightful pain, and enormous expense, to escape which, or a considerable portion of which, would seem to be possible and well worth the attempt. With a more general knowledge of the common causes of these diseases, many more persons than now, it is believed, might escape them.

The large prevalence of diarrhea in October, 1879, may have been in part caused by the unusually high temperature of that month. By referring to the diagrams in the article on the Principal Meteorological Conditions in 1879, on following pages of this Report, it may be seen that there was in October, 1879, a noticeable rise in the lines representing the temperature and the absolute humidity. There is also evidence of a falling off in the quantity of ozone, by the day observations, in the same month, and a rise in the atmospheric pressure.

DISEASES IN ANIMALS IN 1879.

21. During the year 1879, what diseases occurred, *at what time*, and *to what extent among animals?* The term epizoöty has been much used in this State relative to disease among animals; as it does not designate a definite or distinct disease, please describe the character of any disease which may have occurred.

In reply to this question, 7 correspondents made no statement. Eleven correspondents stated that there was no disease among animals in 1879. One correspondent reported "distemper or epidemic catarrh and kidney affections among horses." One stated, "if any, accidental or sporadic." Two stated, "no epidemic." One reported "some mortality among horses, but cannot tell disease." Hen-cholera was reported present in November, by 1. One correspondent reported "hog cholera in September, October, and November, and a disease among hens not understood and quite fatal;" one correspondent said, "None. Said to be a few cases of hog-cholera." Two said, "none of any amount." Texan cattle disease was reported by 1, supposed to have caused the death of 400 cattle.

DISEASES IN FRUITS, CEREALS, GRASSES, POTATOES, AND OTHER CROPS.

22. During the year 1879, what diseases, as rot, rust, smut, bunt, mildew, or mould, occurred among the crops, as potatoes, hops, fruits, and especially cereals and grasses?

In reply to this question, 4 correspondents made no statement. Rot in potatoes was reported by 6. One stated "potatoes poor quality, watery, would not keep." Diseases in apples were reported as follows: "Would not keep," by 1; "apples drop prematurely," by 1; apples rotted, by 4. Smut in corn was reported by 3. Rust was reported as follows· "In a few low localities," by 1; "grass and hay were very good except slight rust," by 1; "rust in wheat," by 1. Two correspondents reported crops in good condition. One reported no farming in his locality, and 11 reported that there was no disease among the crops in 1879, one of them excepting potato-bugs and fruit-worms.

23. As regards rye, oats, corn, buckwheat, and other grains raised in 1879, wheat in particular, what was the actual condition when ready for market or use?

In reply to this question, 5 correspondents made no statement; 17 correspondents stated that the condition of crops when ready for market and use was good; 4 others stated that the crops were in good condition, one of them excepting corn which was soft and rotten; two, excepting wheat as being damp; and one, excepting oats as being inclined to mould; 3 reported corn soft, "rotten, grown in the shook, in piles, and in bin," or "some mouldy." One reported some wheat grown; one replied, "somewhat shrunken and damp," without naming any crop.

24. Were any of these grains, mentioned in question 23, affected by any kind of fungus?

In reply to this question, 5 correspondents made no statement; sixteen stated that there was no fungus in the grains mentioned; one reported "fungus in the corn;" one, "corn to a small extent;" one, "ergot of rye and corn as usual;" three, "smut in corn;" one, "not much;" and one, "no more than usual."

25. Was the wheat raised in 1879 generally allowed to get thoroughly dry before it was threshed?

In reply to this question, 6 correspondents made no statement; 3 correspondents stated that it was not; 20 stated that it was.

26. Did a *greater*, a *less*, or the *usual proportion* of wheat raised in 1879 "bank" in the bin?

In reply to this, 10 correspondents made no statement; 8 correspondents stated that less than the usual proportion of wheat "banked" in the bin; 5 stated that the usual proportion, and 1, that a greater than the usual proportion, "banked;" and five did not learn of any wheat "banking" in the bin.

27. Was the hay-crop, secured in 1879, *more* or *less than usually* affected by mildew or mould?

In reply to this question, 6 correspondents made no statement; 6 answered "less;" 7, "about as usual;" 1, "more;" 1, "none;" 2, "no;" 5 said that it was secured in good condition; 1, "hay cut early was injured; after July 5, none."

METEOROLOGICAL CONDITIONS IN 1879.

28. Please give a summary statement of the meteorological conditions during the year 1879, specifying, if possible, the general character for each month, and noting any peculiar or unusual conditions.

In reply to this question, 21 correspondents made no statement. One stated that April and May were very wet, July, August, and part of September, very dry. One replied, "average with other years." One, January, February, March, mild; April and May, wet; cold spells injuring fruit very much; June, very hot, much rain; July, August, and September, very hot and an unusual amount of damp weather; October, November, and December, good weather. One replied, ozone, 1 to 7; more in night and in cold weather. Dr. W. H. Rouse, of Detroit, gives a table and general summary; and Drs. Hazlewood, of Grand Rapids, Loop, of Port Sanilac, and Corbin, of St. Johns, also give longer summaries, which are printed with their replies.

CONDITION OF THE SOIL, AS TO MOISTURE, IN 1879.

29. Please state the facts concerning the *soil moisture* in your locality, during each of the months in the year 1879, *without reference to previous years* but comparing the months in 1879 with each other. Group them in order—driest first.
30. *Compared with previous years* in what months of the year 1879 was the *soil* in your locality *unusually dry?*
31. *Compared with previous years* in what months of the year 1879 was the *soil* in your locality *unusually moist?*

An abstract from the replies to these questions and a summary, are given in Exhibit 5, page 239.

DEPTH OF WATER IN WELLS, DISTANCE DOWN TO GROUND WATER, ETC.

32. Please state the average depth of water in wells in your locality, in each month of the year 1879.
33. In your locality, what is the *usual average depth of earth above the ground water*, as indicated by distance down to water, from general surface of ground, in wells, streams, etc.? If different parts of your locality vary greatly, please answer for such different parts.
34. Without reference to previous years, please state the facts concerning the *depth of earth above the ground water* nearest the surface, in your locality, during each month of the year 1879, as indicated by the distance down to water in wells, streams, etc., or by other facts. How many feet and inches do you estimate it, in each month?
35. Compared with previous years, in what months of the year 1879 was the *ground water* in your locality *unusually high?*
36. Compared with previous years, in what months of the year 1879 was the *ground water* in your locality *unusually low?*

Twenty-four correspondents replied to at least one of the 5 questions above. A tabular abstract and a summary from the replies to these questions are given in Exhibit 6, on pages 240–1.

EXHIBIT 5.—*Soil Moisture in Michigan by Months during the Year 1879, as Indicated by the Replies of 18 Correspondents to Questions 29, 30, and 31, of Circular 38 from the State Board of Health.*

Divisions* and Localities.	Soil Moisture by Months and without Reference to Previous Years. Months in Order of Dryness. Driest First.—(Question 29, page 238).	Soil Unusually Dry. Time.—(Question 30, page 238).	Soil Unusually Moist. Time.—(Question 31, page 238).
All Localities.	†	‡	§
WESTERN DIVISION.*			
Cedar Springs	July, August, September; April, and May very wet.	July and August	May and June.
Grand Rapids	August, July, May, June, September, April, March, Jan., Feb., Oct., Nov., and Dec.	April, June, July, and August	Oct., Nov., and Dec.
BAY AND EASTERN.*			
Bay City		Average with other years.	Average with other years.
Lapeer		Not any	Nov. and Dec.
Port Sanilac	June, July, May, Aug., Oct., Dec., Mar., Apr., Sept., Feb., Jan., Nov.	June	At no time.
Zilwaukee	August or September	September	April and May.
CENTRAL DIVISION.*			
De Witt	Latter part of July and August.		
Muir	June, July, August, April, May, Sept., Oct., Nov., Dec., Jan., Feb., and March.		
St. Johns	See reply on following pages	August.	
Vernon	About as usual	July and August	Perhaps Sept.
Webberville	June, July, Aug., May, Sept., Oct., Jan., Feb., Mar., Apr., Nov., and December.	In no month	Nov. and Dec.
SOUTH-WESTERN.*			
Pokagon		August and Sept.	Nov. and Dec.
SOUTHERN-CENTRAL.*			
Centerville	No continuous drouth. Rains frequent in Summer.	At no time	July and Sept.
Hillsdale	Aug., July, Sept., driest; Oct. and Nov., good; Apr., May, and June, wet.	No suffering from drouth in any month.	April and May.
Hudson	Winter months most wet	Sept. and Oct.	Nov., Dec., 1879, and Jan., 1880.
Three Rivers	May, Aug., Sept., July, June, Fall months wet. Winter and Spring, snow.	None	None.
Union City	Oct., Nov., Dec., dry; Apr., May, June, next; July, Aug., Sept., average wet; Jan., Feb., and March, wet.	None	Jan., Feb., March.
SOUTH-EASTERN DIV.*			
Wyandotte	No records	Very dry in latter part of Summer and Fall.	

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* For counties in each division, see Exhibit 1, page 227.

† These statements cannot well be summarized. Most of them name the months in order of dryness of soil, driest first. Fifteen correspondents made statements in reply to the question (29.)

‡ Soil reported **unusually dry** at some time of the year 1879 by 9 correspondents, as follows: In April, by 1; in June, by 2; in July, by 3; in August, by 5; in Sept., by 3; in Oct., by 1. One reported it was an average with other years; also reported unusually moist at no time by 6.

§ Soil reported **unusually moist** at some time of the year 1879 by 12 correspondents, as follows: In Jan., by 1; in Feb., by 1; in Apr., by 2; in May, by 3; in June, by 1; in July, by 1; in Sept., by 1; in Oct., by 1; in Nov., by 5; in Dec., by 5; in Jan., 1880, by 1. One reported it was an average with other years; also reported unusually moist at no time by 2.

EXHIBIT 6.—*Depth of Water in Wells, Depth of Earth above Ground Water, and Relative Height of Ground Water, in Michigan, by Months, during the Year 1879,—as Indicated by the Replies of 24 Correspondents to Questions 32, 33, 34, 35, and 36, of Circular 38, from the State Board of Health.*

Divisions* and Localities.	Average Depth of Water in Wells, by Months,—(Question 32, page 238).	Usual Depth of Earth above Ground Water.—(Question 33, page 238).	Depth of Earth above Ground Water, by Months.—(Question 34, page 238).	Ground Water Unusually High. Time.—(Question 35, page 238).	Ground Water Unusually Low. Time.—(Question 36, page 238).
All Localities.	†	‡	§	‖	¶
WESTERN DIVISION.*					
Cedar Springs	Spring and Fall, about 8 ft.; Summer, 6 feet.		From 6 to 20 ft. Greatest during Winter and Summer, less in Spring and Fall.	April and May	July and August.
BAY AND EASTERN.*					
Bay City	About 15 ft. to water	Highest point in city, slight 10 feet.			
Lapeer		12 to 30 feet.			
Port Sanilac					Water in Lake Huron lower than for several years.
Saginaw City	From 2 to 8 ft. generally	From 2 to 8 feet generally		About as usual	About as usual.
Zilwaukee	Wells from 6 to 16 feet deep; ground from 2 to 4 feet above river level.	From 2 to 4 feet. In other parts water covers ground or marsh.		May	September and October.
CENTRAL DIVISION.*					
De Witt		Between 20 and 50 feet. Average about 30.			
Hastings		From 20 to 70 feet.			
Muir		About 30 feet, away from the river.			
St. Johns	Little variation during year.	In most places from 10 to 30 feet.	Probably did not vary more than 12 inches during year.		
Vernon		15 to 40 feet	About an average for 40 years.		
Webberville		20 to 30 feet		November and Dec.	Jan., Feb., and March.
SOUTH-WESTERN DIV.*					
Otsego		From 16 to 127 feet.			
Pokagon		15 to 20 ft. along low lands and near streams of water; 30 to 40 ft. on uplands.		November and Dec.	August and September.
SOUTHERN-CENTRAL.*					
Centerville	2 to 4 feet	14 feet	13 to 17 feet	At no time	At no time.
Hillsdale	Wells 30 to 80 ft. deep	From 25 to 80 feet	Shallow wells 20 to 26 ft., varying 4 to 6 ft.; deep wells very little affected by floods or drouths.	April, May, and June, rather high.	Was not as low as usual.

Hudson	2 to 6 feet	6 feet to 30 feet		Nov., Dec., 1879, and Jan., 1880.	September and October.
Mendon		About 17 feet.			
Tecumseh	About 8 feet	16 to 18 feet.			
Three Rivers	4 to 6 feet	20 to 22 feet. Does not vary much.		April and December	June and August.
Union City	5 to 11 feet	40 feet. A few 7 to 12 feet.	35 to 42 ft., except on flats.	Jan., Feb., and Mar.	Oct., Nov., and Dec.
Vicksburg		14 ft. Does not vary much.	About the same	About same as other years.	About same as other years.
SOUTH-EASTERN DIV.*					
Plymouth	Nothing unusual	From flowing springs to 40 feet.			
Wyandotte		Varies 2 to 12 feet	Varies 2 to 12 feet	At no time	At no time.

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* For counties in each division, see exhibit 1, page 227.

† In reply to this question (32), 12 of the 29 correspondents who replied to the circular, made statements (not all of them however by months), concerning the average depth of water in wells in 1879. An abstract from the statements is given in the second column of the exhibit. They cannot well be compiled.

‡ In answer to this question (33), 22 correspondents made statements concerning the usual average depth of earth above ground water in 1879.

§ In reply to this question (34), 8 correspondents made statements concerning the depth of earth above ground water, by months, in 1879.

‖ Ground water reported **unusually high** at some time of the year 1879, by 8 correspondents, as follows: In Jan., by 1; In Feb., by 1; in March, by 1; in April, by 3; in May, by 3; in June, by 1; in Nov., by 3; in Dec., by 4; in Jan., 1880, by 1; about as usual, by 2; at no time, by 2.

¶ Ground water reported **unusually low** at some time of the year 1879, by 7 correspondents, as follows: In Jan., by 1; in Feb., by 1; in March, by 1; in June, by 1; in July, by 1; in Aug., by 3; in Sept., by 3; in Oct., by 3; in Nov., by 1; in Dec., by 1; about as usual, by 2; at no time, by 3. "Water in Lake Huron lower than for several years," by 1.

FACTS AND SUGGESTIONS RELATIVE TO THE CAUSATION, SPREAD, AND PREVENTION OF DISEASES.

37. Please communicate facts bearing upon, or cases illustrating the causation or communicability of diseases.

38. Any suggestions which you may feel inclined to make, concerning methods which seem practicable, for the prevention of sickness or deaths, in your locality, or in this State, need not be withheld.

As stated after question 17, in the absence of positive knowledge, opinions are desired. The fact that it will be difficult, and sometimes impossible, to give the information asked for is well understood; the importance of the subject, however, warrants the request that each correspondent will take the care necessary to give definite replies to all the questions. The great value of a compilation of such replies must be conceded. It is believed that in this way may be accumulated data which eventually will be of great value to the people.

By direction of the State Board of Health.

Very respectfully,

HENRY B. BAKER,
Secretary.

Of the 29 correspondents who replied to the circular, 16 made no statement in reply to questions 37 and 38. The replies by the remaining 13 are briefly abstracted as follows:—

Dr. C. S. Ford, of Cedar Springs, states that he is becoming more convinced that impure water and lax sanitation are the most fruitful sources of disease. He gives his observation that 75 per cent of all cases of malarial fever and dysentery, occurring in 1879, was in families where no regard was paid to cleanliness of person or premises.

Dr. W. R. Marsh, of Bay City, states the unsanitary fact that, under many of the houses in the outskirts of the city, the ground is lower than around the house and allows water to collect under the house and slowly waste away. He also states that the people are steadily improving in their manner of living and in taking care of themselves.

Dr. H. McColl, of Lapeer, recommended as a sanitary measure "more complete drainage, better ventilation, isolation of those sick with communicable diseases, a better knowledge among the people as to what they should eat, and how to cook it." He also said that by laying township drains hundreds of acres of land had been reclaimed, and a source of malarial poisoning had been removed, and the health of the locality made better.

Dr. Geo. Hendry, of Zilwaukee, recommended "better education, and not so early marriages." He stated that he found a large infant mortality among the children of young mothers belonging to the working-class, due to ignorance and willful neglect,—mothers "too ignorant to place a true value upon their offspring; simply considering them a trouble and burden." To this source he attributed disease and crime. He also recommended better drainage, better ventilation, and a greater distance between dwellings and out-buildings.

Dr. G. E. Corbin, of St. Johns, wrote of the overcrowding of school-rooms at St. Johns. His reply is printed as an article on "Unsanitary Conditions in Our Public Schools," on pages 185–190 of this Report.

Dr. D. C. Holly, of Vernon, recommended perfect drainage, and dry locations for dwellings; that no cesspools or garbage be allowed around the back of the house; a dry cellar with no vegetables, excepting dry potatoes, to be kept in it from Fall until Spring; privies without vaults, to be located 100 to 150 feet from dwellings, and excrement to be removed once in 3 months. [The State Board of Health does not recommend such a privy as being the best, though it would, probably, be an improvement over existing ones. A dry-earth closet, with the contents removed often is far preferable.] He would have no wells but drive-wells; and would have barn-yards, etc., farther from the house than is usual.

Dr. R. B. Smith, of Webberville, stated that proper drainage of low lands, cellars, and cesspools would, in his opinion, prevent a great deal of sickness. He had found privies within 20 feet of the wells, and in some cases on higher ground, and a sandy soil at that.

Dr. C. P. Wells, of Pokagon, stated that the rules recommended by this Board relative to the restriction and prevention of contagious diseases were more generally understood and adopted, hence such diseases had not spread to any alarming extent in his locality for several years.

Dr. Marden Sabin, of Centerville, reported as a possible cause of diphtheria, the drying up of a mill-race. This was quite fully reported in the Report of this Board for 1879, on pages 115–117, where a plat of the locality may be found. He also stated that by his own experience as health officer he has found the best way to secure reports of diseases dangerous to the public health is to publish in the local paper quarterly the sections of the law requiring the notices, and relative to the duties of officers when such notices are not given. He says: "This course has secured reports more promptly with us than the distribution of blanks for that purpose through the postoffice."

Dr. John W. Falley, of Hillsdale, gave a description of the great difficulty in sewering part of that city, owing to a stratum of shale rock lying so near the surface of the ground, through which it was nearly impossible to dig a sewer. He stated that the time was not far off when it would be necessary to use absorbents and remove the fecal matter regularly.

Dr. Nelson H. Claflin, of Union City, recommended the removal of decaying vegetables from cellars, and a better ventilation of cellars, and of the dwellings, both day and night. More care that wells should not be contaminated from slops thrown on the ground, and in the preparation of plain, wholesome food.

Dr. S. C. VanAntwerp, of Vicksburg, referred to the sandy soil in that locality, and to the fact that their millpond is fed by springs, as favoring exemption from disease. He stated that where diphtheria had been most prevalent there was a damp, cold soil either upon the surface or a few feet underneath.

Dr. W. H. Rouse, of Detroit, stated that the actions of the people in sanitary subjects could not be controlled by law, but thought much might be done by lectures and teaching in the schools, and by sanitary discussions and publications.

Dr. J. M. Swift, of Northville, recommended better attention to requirements of law by physicians and householders in reporting diseases dangerous to the public health.

For convenience of study and reference, the replies to the circular have been grouped by geographical divisions of the State, which divisions are shown in Exhibit 1, page 227. It should be remembered that the Board assumes no responsibility for opinions or theories expressed by those who reply to its circulars, but its correspondents have been selected with great care, and include many of the leading physicians in the State.

Respectfully submitted,

Henry B. Baker,
Secretary.

The replies to Circular 38 are as follows:—

WESTERN DIVISION OF THE STATE.[*]

REPLIES BY C. S. FORD, M. D., OF CEDAR SPRINGS, MICH.

1.[†] The incorporated village of Cedar Springs, about 1500 inhabitants.
2. Eleven.
3. One mile square.
4. Thirty per cent less.
5. Twenty per cent less.
6. Consumption.
7. I cannot.
8. Absence of malignant and contagious disease of severe type.
9. In large degree to sanitary measures being enforced.
10. Consumption.
11. No special cause.
12. Prevailing diseases less violent.
13. No epidemic of severe type.
14. Consumption; all causes of death during September, October, and November.
15. Scarlatina during spring months, but of mild type.
16. Was none.
17. Scarlet fever, 12; whooping-cough, 75; measles, 15; diphtheria, 14.
18. Small-pox, cholera, typhoid fever, cerebro-spinal meningitis.
19. No.
20. Whooping-cough, during May, June, and July; measles, November, and December; scarlet fever, January, February, and March; diphtheria, March, April, and September.
21. I cannot tell; I cannot find that horses or cattle were affected during the year.

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[*] For counties included in each division, see Exhibit 1, page 227.

[†] The figures beginning paragraphs refer to questions in Circular 38, printed (in small type) on pages 224-241 of this Report. A summary of the replies is printed on pages 224-243.

22. Potatoes were poor quality and watery; apples would not keep,—rotted early in the season and did not ripen.
23. All good, except corn, which was soft and rotten.
24. Fungus in the corn.
25. Yes.
26. I cannot learn of a single case.
27. Was in splendid condition.
28. I kept no record, but I think of no special difference, except April and May, which were very wet, and July, August, and part of September, very dry.
29. July, August, and September. I cannot give facts except for April and May, very wet.
30. July and August.
31. May and June.
32. Spring and Fall about 8 feet; during Summer months perhaps 6. As the wells in this village are all drive or iron they are difficult to measure.
34. From six to twenty feet; greatest during Winter and Summer, less in Spring and Fall months.
35. April and May.
36. July and August.
37. Nothing new that is important to communicate. As I study I am becoming more and more convinced that impure water and lax sanitary measures are our most fruitful source of disease. This village has splendid water, and since sanitary measures have been rigidly enforced it is apparent to the careful observer that to these in a great measure the credit belongs. I observe that 75 per cent of all cases of malarial fever and dysentery during the year 1879 has been confined to families who have no regard to cleanliness of persons or the premises they inhabit.

C. S. FORD, M. D.

Cedar Springs, Kent Co., Mich., March 29, 1880.

REPLIES BY A. HAZLEWOOD, M. D., OF GRAND RAPIDS, MICH.

1.† City of Grand Rapids; estimated population in Summer of 1879, 33,500.
2. Sexton's reports from city cemeteries give 577; estimate 18 per 1,000 of population.
3. City of Grand Rapids, and adjoining territory north, east, and south of the city.
4. Increased, 25 per cent.
5. Increased, 4 to 5 per thousand of inhabitants.
6. Diphtheria, measles, mumps.
10. Diphtheria.
17. Impossible to form an estimate; one case said to be cholera.
18. Small-pox, cholera (?).
19. Yes.
20. *January:* Influenza, remittent fever, bronchitis, whooping-cough, consumption, diphtheria, tonsilitis.
February: Influenza, remittent fever, bronchitis, tonsilitis, whooping-cough, diphtheria, consumption, pneumonia.
March: Influenza, remittent fever, bronchitis, whooping-cough, tonsilitis, diphtheria, mumps.
April: Influenza, mumps, remittent fever, whooping-cough, consumption, bronchitis, diphtheria, scarlet fever.
May: Remittent fever, influenza, tonsilitis, mumps, bronchitis, neuralgia, whooping-cough, diphtheria.
June: Remittent and intermittent fevers, influenza, measles, neuralgia, consumption, diphtheria.
July: Remittent and intermittent fevers, Influenza, tonsilitis, neuralgia, diarrhea, diphtheria.
August: Diarrhea, remittent and intermittent fevers, tonsilitis, influenza, measles, diphtheria.
September: Remittent and intermittent fevers, influenza, tonsilitis, measles, diarrhea, diphtheria.
October: Remittent and intermittent fevers, diphtheria, influenza, tonsilitis, scarlet fever, consumption.
November: Remittent and intermittent fevers, influenza, diphtheria, tonsilitis, consumption, pneumonia.
December: Influenza, remittent and intermittent fevers, tonsilitis, consumption, diphtheria, measles, pneumonia.
28. *January:* Mostly cloudy, with much snow; not very cold.
February: Weather variable; sharp frosts and mild weather; cloudy; not much rain-fall.
March: Weather mild; moderate frosts at night.
April: Dry, mild, dusty weather.
May: Early in the month quite cold; afterwards quite the reverse.
June: Weather cool for season; a sharp frost destroyed early vegetation, followed in the last few days with hot weather.
July: Very hot, dry, and dusty.
August: Dry, hot weather, with some chilly nights.
September: Cool and cloudy.
October: Some warm weather early in the month; with murky days in the middle, followed by cool rains and weather.
November: Weather variable.
December: Very variable weather.
29. August, July, May, June, September, April, March, January, February, October, November, December.
30. April, June, July, and August.
31. October, November, and December.

A. HAZLEWOOD, M. D.

Grand Rapids, Mich., March 24, 1880.

BAY AND EASTERN DIVISION OF THE STATE.*

REPLIES BY W. R. MARSH, M. D., OF BAY CITY, MICH.

1.† About 16,000.
2. I have no statistics.
3. The territorial limits of the corporation of Bay City.
4. I think 7 or 8 per cent less than in 1878. I have not the supervisor's figures for the city, that would show the figures exactly.
5. About the average.
6. Diphtheria, croup, and tonsilitis.
7. They did not seem epidemic, but were sporadic over the city.
8. Small-pox and scarlet fever.
9. General improvement of city, such as prevails in cities as new as this, and lack of contagion.
10. Consumption and cancers.
11. I cannot.
12. Very few fatal cases of fever and scarlet fever.
13. Less miasmatic impression.
14, 15. There was no period when the death-rate was noticeable for variation from an average.
16. I do not know of any unusual disease.

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* For counties included in each division, see Exhibit 1, page 227.

† The figures beginning paragraphs refer to questions in Circular 38, printed (in small type) on pages 224-241 of this Report. A summary of the replies is printed on pages 224-243.

17. I have no figures to name.

18. Small-pox, cholera. I do not think there has been a case of typhoid fever, although there are many *so called* which are continued malarial fevers.

19. I think not.

20. I cannot.

21–27. I have no means of knowing.

22. There is no farming in our locality.

28. As we have no observers of climate and seasons in our city, I cannot give to you such answers as I would like. You must be aware that among such a work-day people as we are, one can hardly spend time for instruments to take the observation necessary to answer as definitely as would be pleasant and satisfactory as ought to be done. We have no meteorological or weather observers of any kind in our town. A cautionary signal is raised by our port collector, communicated by telegraph, when storms approach. We send to the world lumber and salt, and live quite too recklessly for a satisfactory condition of civilization.

29, 30, 31. It was an average with other years.

32. Our wells are about 15 feet to water.

33. Our highest point in the city is slight 10 feet; the ground is almost level.

37. Nearly all houses in the outskirts of the city are set on posts in the ground, and often the earth is lower under the house than around it, leaving the water to waste away slowly. I think the fact is bad.

38. We are steadily improving in our manner of living and taking care of ourselves.

Very respectfully,

Bay City, Mich., Feb., 1880. W. R. MARSH,

REPLIES BY H. M'COLL, M. D. OF LAPEER, MICH.

1.† Lapeer City, population about 3,000.

3. City of Lapeer, township of Mayfield, parts of townships of Oregon, Elba, Hadley, Lapeer, and Attica.

4. Diminished about one-fourth.

5. Diminished about one-third.

6. Diphtheria.

8. Continued fevers and dysentery.

9. The better drainage of the towns, especially the town of Mayfield.

10. From none.

12. Dysentery and pneumonia.

13. Not able to state any cause.

14, 16. Not any.

17. Scarlet fever, 5; typhoid fever, about 6; whooping-cough, 4 or 5; diphtheria, about 40.

18. Small-pox, cholera, cerebro-spinal meningitis.

19. No.

20. Intermittent and remittent fevers in Aug., Sept., and Oct.; diarrhea and dysentery in Aug. and Sept.; pneumonia, bronchitis, and rheumatism in Jan., Feb., and March; bronchitis and diphtheria in Oct., Nov., and Dec.

21. No disease among the animals.

22. Some rust in a few low localities.

23. Good, although wheat was a little damp when threshed in the field.

24. No.

25. No. A good deal was threshed in the field.

27. About the usual condition.

30. Not any.

31. November and December.

33. Twelve to 30 feet in various parts.

37. More complete drainage, better ventilation. Isolation of those sick with communicable diseases, and a better knowledge among the people of what they should eat, and how to cook it. It is a lamentable fact that so many people have no knowledge in regard to this important item, and that there is but little even among well-to-do people. A great deal has been done in this locality by township drains. Hundreds of acres of land have been reclaimed, and a source of malarial poisoning has been removed; and though the people curse the drain commissioner, they acknowledge that health is better than before the drains were put in.

Lapeer, Mich., March 15, 1880. H. McCOLL.

REPLIES BY J. M. LOOP, M. D., OF PORT SANILAC, MICH.

1.† Village, 600; township, 2,600.

2. Village, 2; township, 13.

3. Sanilac township and the village of Port Sanilac.

4, 5. About the same.

6. Measles.

7. No reason to assign.

8. Typhoid fever and consumption.

9. No special cause to assign.

10. Measles.

11. Want of medical attendance and proper care.

14. During the months of Feb and March there were five deaths from measles, all occurring in children less than five years of age.

16. None to be mentioned.

17. Cannot give the number of cases of measles, but they were numerous.

18. Small-pox, cholera, scarlet-fever, typhoid fever, whooping-cough, cerebro-spinal meningitis, diphtheria.

19. Not to my knowledge.

20. *January:* Measles, influenza, pneumonia, mumps, intermittent fever, neuralgia, tonsilitis.
    February: Measles, influenza, pneumonia, rheumatism, mumps.
    March: Measles, influenza, pneumonia, rheumatism, sore throat (not diphtheria), neuralgia, tonsilitis.
    April: Influenza, rheumatism, intermittent fever, bronchitis, tonsilitis.
    May: Tendency to throat and lung affections.
    June and *July:* Tendency toward bowel complaints.
    August: Diarrhea, intermittent fever, remittent fever.
    September: Typho-malarial fever, intermittent fever, diarrhea.
    October: Intermittent fever, typho-malarial fever, diarrhea, dysentery, erysipelas.
    November: Croup, intermittent fever, typho-malarial fever, rheumatism, tonsilitis, erysipelas.
    December: Rheumatism, influenza, intermittent fever, diarrhea.

21. To my knowledge no disease has occurred.

22. Crops generally have been good and free from all disease.

23. Good.

24. Corn to a small extent.

25. It was.

26. Less.

27. The hay crop was light, though of good quality.

28. Can give nothing more than a general statement of the weather for each month:—
    January: Steady cold weather with snow.
    February: Cold weather with some snow.
    March: Cold and generally clear, with little snow.
    April: Cool and clear, with little snow or rain.
    May: Warm days and frosty nights, with little rain.
    June: Warm pleasant weather, with moderate amount of rain.
    July: Clear Summer weather with a few hard thunder storms.
    August: Dry and warm; not much rain.
    September: Moderately warm with frequent light rain-storms.
    October: Remarkably warm and pleasant for the season.
    November: Rainy but not cold.

December: Cold, but very little snow.

29. June, July, May, August, October, December, March, April, September, February, January, November.

30. June.

31. At no time.

36. The water in Lake Huron was lower than have noticed for several years.

J. M. LOOP, M. D.

Port Sanilac, Mich., March 3, 1880.

REPLIES BY N. D. LEE, M. D., OF SAGINAW, MICH.

1.† 10,200 to 10,500.

2. One hundred and fifty-nine.

3. City of Saginaw.

4. A little greater.

5. Greater than last year by forty-nine deaths.

6. Diphtheria, consumption, and bowel complaints.

7. I cannot, except the usual origin.

8. Not certain.

9. Nothing that I know of.

10. Pneumonia, diphtheria, and consumption, and heart diseases from neuralgia and rheumatism, etc.

11. I cannot with certainty.

12. I cannot be certain.

14. We have more deaths in the hot months from malaria, and improper food, and from lung-troubles in Winter and Spring months; diphtheria and other contagious and infectious diseases seem to have but little choice of seasons for their death-work.

15. I cannot.

16. Cannot, except that we have had a little of almost everything (excepting small-pox) during the year.

17. I cannot.

18. Small-pox and cholera.

19. Yes. Diphtheria, measles, whooping-cough, and scarlet fever.

20. Cannot.

21. Do not know.

22. Nothing as far as I know, except potato-bugs and fruit-worms.

23. Good.

24. Not much.

25. Yes.

26. Less, I believe.

27. No.

28 and 29. Cannot.

30 and 31. Do not know.

32. From two to eight feet generally.

33. Same as question 32.

34. Cannot with certainty.

35 and 36. About as usual.

37. Cannot.

38. Nothing new to communicate.

Respectfully yours,

N. D. LEE, M. D.

Saginaw, Mich., June 21, 1880.

REPLIES BY GEORGE HENDRY, M. D., OF ZILWAUKEE, MICH.

2.† Thirteen, one from drowning.

3. Township of Zilwaukee.

4. Was increased.

5. Cannot tell.

6. No one disease more prevalent than other years.

7. Scarlet fever, caused by importation.

8. Bowel complaints.

9. Lower degree of temperature.

10. None.

11. No unusual mortality from any disease.

12. Bowel troubles.

13. Less diseases of the bowels.

14. There were none.

15. Whooping-cough.

16. Whooping-cough, April; measles, March; scarlet fever, January.

17. Whooping-cough, 107; diphtheria, 1; measles, 39; typhoid fever, 7.

18. Small-pox, cholera, cerebro-spinal meningitis.

19. No.

20. Cannot say.

21. Do not know.

22. Rot, or black inside to potatoes; grains and hay were very good with exception of slight rust.

23. Somewhat shrunken and damp.

24, 25. No.

26. Do not know.

27. Less than previous years.

28. Cannot say.

29. August or September.

30. September.

31. April and May.

32. Cannot say. Wells are from 6 to 16 feet deep, and ground from 2 to 4 ft. above river level.

33. From 2 to 4 feet, in other parts water covers ground or marsh.

34. Do not know.

35. May.

36. September and October.

37. Bad water in causing typhoid fever. In one house there were six cases which arose from this cause. Well from which water was obtained was within 18 feet of a privy, with sandy soil. In another family with well in cellar, there were five cases. All of the above got well, cases running from 2 to 4 weeks. All cases of diphtheria that I have seen were in badly-ventilated and overcrowded houses. All cases, both of diphtheria and typhoid fever, that I can at present think of, were among the German working-classes.

38. Better education, and not so early marriages. I find among the working-classes a large infant mortality among the young mothers through ignorance and willful neglect; too ignorant to place a true value upon their offspring; simply considering them a trouble and burden. From this source arise disease, also crime. Better drainage and better ventilated houses with greater distance between dwellings and out-houses.

Respectfully,

GEO. HENDRY, M. D.

Zilwaukee, Saginaw Co., May, 1880.

CENTRAL DIVISION OF THE STATE.*

REPLIES BY G. W. TOPPING, M. D., OF DEWITT, MICH.

1.† Three hundred.

2. Six.

3. Village of DeWitt and 5 miles around.

4. Greater, about 25 per cent.

5. Greater, about 20 per cent.

6. Diphtheria.

7. Diphtheria spread from contagion.

8. None in particular.

10. Diphtheria and paralysis.

11, 12. Can not say.

14. Diphtheria was extensively prevalent during January and February, with a very small percentage of deaths. During the last of March and the fore part of April there were a few cases of diphtheria with a large percentage of deaths. Two deaths occurred from paralysis in the village of DeWitt during the latter part of February and the fore part of March.

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* For counties included in each division, see Exhibit 1, page 227.

† The figures beginning paragraphs refer to questions in Circular 38, printed (in small type) on pages 224-241 of this Report. A summary of the replies is printed on pages 224-243.

15. None in particular.

16. Diphtheria in Winter and Spring months, and a little in June and July; whooping-cough in Aug. and Sept.; measles in Dec.; scarlatina in January; typhoid fever in Sept., Oct., and Dec.; puerperal fever in Jan. and Nov.; erysipelas in Jan.; dropsy in Jan.; apoplexy and paralysis in Feb., Mar., Apr., May, and June; Bright's disease in Feb., Mar., and Apr.; membraneous croup in April and Dec.; tape worm in April; erythema nodosum in May, June, and July.

17. Can only give estimates for territory above named, which are as follows: Diphtheria, 60; cholera infantum, 10; scarlet fever, 10; typhoid fever, 8; measles, 5; whooping-cough, 15.

18. Small-pox, cholera, cerebro-spinal meningitis.

19. Yes, diphtheria and whooping-cough.

20. *January:* Diphtheria, bronchitis, tonsilitis, neuralgia, rheumatism, scarlatina, puerperal fever, pneumonia, metrorrhagia, dropsy, pulmonary consumption, necrosis, whitlow, synovitis, and insanity.

February: Bronchitis, diphtheria, tonsilitis, neuralgia, rheumatism, pneumonia, ulcers of os uteri, apoplexy, eczema, Bright's disease, pulmonary consumption, epilepsy, intermittent fever, cancer.

March: Bronchitis, tonsilitis, pneumonia, neuralgia, rheumatism, intermittent fever, remittent fever, diphtheria, ulcers of os uteri, Bright's disease, pulmonary consumption.

April: Bronchitis, pneumonia, tonsilitis, intermittent fever, neuralgia, remittent fever, rheumatism, diphtheria, eczema, Bright's disease, pulmonary consumption, paralysis, lithiasis, ulcers of os uteri, anemia.

May: Bronchitis, tonsilitis, intermittent fever, neuralgia, remittent fever, rheumatism, consumption, Bright's disease, ulcers of os uteri, eczema, colic, dysmenorrhoea, diphtheria, strangury, paralysis, anemia, erythema nodosum.

June: Intermittent fever, remittent fever, bronchitis, neuralgia, tonsilitis, rheumatism, cerebral hyperæmia, pulmonary consumption, eczema, erythema nodosum, ulcers of os uteri, burns, paralysis.

July: Intermittent fever, remittent fever, bronchitis, neuralgia, tonsilitis, fractures of arm and leg, rheumatism, pulmonary consumption, burns, erythema nodosum, eczema, dropsy, anemia, diarrhea.

August: Intermittent fever, remittent fever, bronchitis, diarrhea, dysentery, rheumatism, whooping-cough, fractures of thigh and arms, neuralgia, tonsilitis, anemia, dropsy, ulcers of os uteri, abortion, ophthalmia, pulmonary consumption, diphtheria.

September: Diarrhea, intermittent fever, remittent fever, rheumatism, bronchitis, tonsilitis, neuralgia, dropsy, fractures of leg and arms, pulmonary consumption, dysentery, erysipelas, typhoid fever, abortion, lumbago, ophthalmia.

October: Diarrhea, intermittent fever, bronchitis, remittent fever, tonsilitis, neuralgia, rheumatism, pulmonary consumption, fractures, anemia, erysipelas, dysentery, lumbago, dropsy, eczema, gonorrhea, typhoid fever.

November: Bronchitis, tonsilitis, neuralgia, rheumatism, diarrhea, intermittent fever, pneumonia, pulmonary consumption eczema, remittent fever, puerperal fever, wounds, abcess, gonorrhea, lithiasis.

December: Bronchitis, tonsilitis, neuralgia, rheumatism, eczema, pneumonia, pulmonary consumption, metrorrhagia, measles, lithiasis, valvular disease of heart, gonorrhea, anemia, dysmenorrhea.

21. Distemper or epidemic catarrh has been common among horses, and some of these cases have been called epizooty. The principal symptoms have been shivering, fever, swelling of glands of neck, cough, difficult deglutition, red nostrils, and later an offensive or mattery discharge from nostrils. Swelling of limbs in some cases. Nasal discharge often late in appearance and scanty in amount. Some swelling of glands, and cough with throat rales often remain for long time. Kidney affections—so called—have been common among horses. I cannot describe it further than to say that frequent micturition with diminished urinary evacuations have been the most prominent symptoms.

22. Potatoes on low ground were somewhat affected by rot; other crops were generally healthy.

23. These grains were generally in a good condition when marketed.

24. No.

25. Yes.

26. The usual proportion.

27. About as usual.

28. Did not keep meteorological record.

29. The latter part of July and month of August was very dry. Can not give moisture for different months.

30, 31, 32. Can not answer.

33. Depth of wells varies with location; generally between 20 and 50 feet deep. Average about here 30 feet.

34, 35, 36. Can not answer.

G. W. TOPPING.

DeWitt, Mich., April 1880.

REPLIES BY A. P. DRAKE, M. D., OF HASTINGS, MICH.

1.† About 2,800.

2. Have no means of knowing.

3. A radius of from five to six miles.

4 and 5. About the average.

6, 7, 8, 9, 10, 11, 12, and 13. Do not think there was anything unusual.

14, 15, 16. Do not think there were any.

17. Could not say.

18. Small-pox, cholera, scarlet fever, measles.

19. No.

20. Cannot say.

21. Do not know of any.

22. Not any.

23. Dry and good.

24. No.

25. Yes.

26 and 27. About as usual.

28, 29, 30, 31, and 32. Have no means of knowing.

33. From twenty to seventy feet.

34, 35, and 36. Have no neans of forming estimate.

37. Know of none in this locality.

Respectfully yours,
A. P. DRAKE, M. D.
Hastings, Mich., April 30, 1880.

REPLIES BY H. W. BROWNE, M. D., OF HUBBARDSTON, MICH.

1.† Incorporated village; 500.

2. Ten.

3. County corners of Gratiot, Montcalm, Ionia, and Clinton, and a radius of 12 miles from this centre.

4 and 5. About the same.

6. None that I am aware of.

17. No cases of diseases named in this village. I cannot say as to the whole territory for which replies are made.

18. Small-pox, cholera, cerebro-spinal meningitis, and diphtheria.

19. No means of knowing.

20. No.

21. Heard of nothing unusual.

22. Smut in corn.

23. Good. Wheat dry and fine.

Respectfully,
HENRY W. BROWNE.
Hubbardston, Mich., April 15, 1880.

REPLIES BY L. S. STEVENS, M. D., OF MUIR, MICH.

1.* Village; about 1,200 inhabitants.
2. Ten.
3. Muir and immediate vicinity.
4. Less.
5. About the same.
6. Cancer.
8. No epidemic in 1879.
9. Uniform temperature.
10. Cancer.
17. None of the diseases mentioned prevailed as an epidemic.
18. Small-pox, cholera, measles, cerebro-spinal meningitis, diphtheria.
19. No.
20. Intermittent fevers prevailed during the whole year. Whooping-cough, a few cases in a mild form among infants during the months of August, September, and October, one or two mild cases of scarlatina.
21, 22. None.
23. Good.
24. No.
25. Yes.
26, 27. Less.
28. Could not answer the question satisfactorily, as I did not make proper observations.
29. June, July, and August, April, May, September, October, November, December, January, February, March.
32. Could not state.
33. About 30 feet, away from the immediate vicinity of the river.
34. Could not answer with any certainty, as I have been here but one year.

Very respectfully,
L. S. STEVENS.

Muir, Mich., March, 1880.

REPLIES BY G. E. CORBIN, M D., OF ST. JOHNS, MICH.

1.* The population of the village of St. Johns is 3,000.

2. With much care I have kept a record of all the deaths occurring in our village during the year 1879. They amount to just 25. Time of deaths: Three died in January, 1 in February, 5 in March, 1 in April, 3 in May, 4 in July, 2 in August, 2 in October, 3 in November, and 1 in December. Age: Three were young infants, 1 was 2 years old, 2 were 7 years of age, 1 was 27, 1 was 39, 1 was 63, 1 was 66, one was 76, one was 81, and one was nearly 90, though I cannot give the exact ages of any of the others. Causes of Death: One died of old age and bad whisky, 1 of whisky alone, 1 of measles, 1 of "ship fever," 1 of paralysis, 2 of cholera infantum, 3 of pneumonia, 3 of diphtheria, 3 of old age, 5 of consumption, 2 from accidents, and 2 from causes unknown.

3. The village of St. Johns.
4. Somewhat greater.
5. Greater.
6. Accidents and consumption.
10. Consumption.
11. Greater extremes of temperature and humidity, I think. See statement in reply to questions 28 and 29.
16. "Ship-fever," in immigrant from Europe.
17. I can not give the number.
18. Small-pox, cholera.
19. Yes, mumps and whooping-cough.
21. Nothing that attracted especial attention.
22. None.
23. Good.
24. No.
25. Yes.
27. In good condition.

28 and 29. *January* and *February:* Cold weather and good sleighing.

March: Cold and dry.

April and *May:* Quite dry and cool. The ground was well soaked with cold rain during the first week in *June.*

August 13 it rained slowly all day. It had been very dry for several weeks before that.

August 30 the ground was excessively dry, "parched," and the grass half dead. Water in wells said to be a *little* lower. I could notice no difference in the drawing from a well where the water is 30 feet from the surface. From some wells where much is used, the surface of the water has been lowered one foot. During the latter part of *August* there was considerble "bowel difficulty" among children, and two died of cholera infantum.

During *September* 2 and 3 *much* rain fell. The whole month was "a wet one."

At the close of *September*, and during the first week in *October* the mercury was remarkably high.

Mercury in shade *September* 30, 80° F. *October* 1, 82° F. *October* 5 and 6, 84° F. Summer temperature continued up to *Oct.* 22, the mercury ranging from 75° F. to 86° F. in the heat of the day, in the shade.

October 23 mercury 45° F. and snowing—first of the season. *November* 2, snow 4 inches deep. *November* 3, at 6 A. M., mercury 10° F., and at 2 P. M. 35° F., and yet apple-trees and others were all in full leaf, not then having been frozen enough to kill the leaves. *November* 11, mercury 68° F., with sharp thunder, lightning, and profuse rain. Grass "fresh and green," and during the day honey-bees came home heavily loaded with pollen from wild flowers.

30. August.
32. There is but little variation during the year.
33. In two or three places springs of water come to the surface. In most places the well-water is from ten to thirty feet below the surface of the earth.
34. Probably did not vary more than 12 inches during the whole year.

[For replies to questions 37 and 38, see an article by G. E. Corbin, M. D., on "Unsanitary Conditions in the Public Schools," pages 185-190 of this Report.—H. B. B., Sec. S. B. of H.]

Respectfully,
G. E. CORBIN.

St. Johns, Mich., March 15, 1880.

REPLIES BY D. C. HOLLEY, M. D., OF VERNON, MICH.

1.* Vernon is an incorporated village of about 600 inhabitants.
2. I remember only two deaths, both very old people, one from bronchial, the other from vesical troubles.
3. My replies will be for about a township of country with about 3,000 people.
4. Less if anything.
5. Should say rather less.
8. Less malarial trouble.
9. Better drainage, better dwellings.
12. Scarlatina, measles, whooping-cough, fevers, etc.
13. No epidemics.
17. Do not believe any cases of those diseases occurred, with the exception of few cases of scarlatina and three or four cases of typhoid fever.
18. Small-pox, cholera, cerebro-spinal meningitis, diphtheria, whooping-cough, measles.
19. Not to my knowledge.

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* The figures beginning paragraphs refer to questions in Circular 38, printed (in small type) on pages 224-241 of this Report. A summary of the replies is printed on pages 224-243.

21. If any have occurred they have been accidental or simply sporadic.
22. Nothing.
23. Have been unusually good.
24. The ergot of rye and corn only as usual.
25. Yes.
26. Heard no complaint whatever.
27. No. Secured in good condition.
28. Unable to answer.
29. About as usual. Cannot give grouping.
30. July and August.
31. Perhaps September.
33. Varies from 15 to 40 feet.
34. Cannot give the figures, but about an average for the last 40 years.
37. Cannot add anything to previous reports.
38. To have healthy homes drainage must be perfect, and the locality of the dwelling perfectly dry; no cesspools or garbage allowed around the back door of the house or kitchen; the cellar dry and no vegetables allowed in it from Fall to Spring, with the single exception of dry potatoes; apples particularly must be kept out. Privies should be located from 100 to 150 feet distant from dwelling; no vaults, but excrements removed once in three months. Wells all drive-well; none other should be allowed. Barn-yards, hog-pens, and henneries farther away than is generally the case.

D. C. HOLLEY, M. D.

Vernon, Shiawassee Co., Mich., March 15, 1880.

REPLIES BY R. B. SMITH, M. D., OF WEBBERVILLE, MICH.

1. Incorporated village. Estimated number of inhabitants 450.
2. Fifteen.
3. Township of LeRoy and village of Webberville.
4. About the same as the average.
5. Greater. Increased about 25 per cent.
6. Diphtheria.
7. I think that clearing new land, ditching and draining is to some extent a source of diseases, at least until marshes and new land are thoroughly subdued.
8. None.
10. Diphtheria.
11. Malignant type of diphtheria.
12. None.
14. Diphtheria in August, September, October, November, and December.
15. None.
16. Diphtheria in August, September, October, November, and December.
17. Scarlet fever, 5; typhoid fever, 4; whooping-cough, 30; diphtheria, 80 to 100; erysipelas, 2; puerperal fever, 2. The cases of whooping-cough and diphtheria were not all reported, so that I am unable to answer correctly.
18. Small-pox, cholera, measles, and cerebro-spinal meningitis.
19. Yes. Whooping-cough.
20. *January:* Tonsilitis, influenza, intermittent fever.
    February: Bronchitis, influenza, pneumonia.
    March: Bronchitis, influenza, rheumatism, intermittent fever, erysipelas, puerperal fever.
    April: Influenza, intermittent and remittent fever, puerperal fever, and consumption.
    May: Intermittent and remittent fever, consumption, erysipelas, rheumatism, and influenza.
    June: Remittent fever, chicken-pox, intermittent fever, bronchitis, neuralgia, and consumption.
    July: Whooping-cough, intermittent fever, diarrhea, scarlet fever, consumption.
    August: Whooping-cough, diphtheria, scarlet fever, intermittent fever, pneumonia, cholera infantum, consumption.
    September: Diphtheria, intermittent fever, diarrhea, cholera infantum, consumption, pneumonia.
    October: Tonsilitis, intermittent and remittent fever, pneumonia, diarrhea, diphtheria, bronchitis.
    November: Influenza, diphtheria, intermittent fever, bronchitis, typhoid fever, pneumonia, tonsilitis, cholera morbus.
    December: Remittent and intermittent fever, diphtheria, diarrhea, whooping-cough, tonsilitis, bronchitis.
21. No data.
22. Rot among apples.
23. Good.
24. No.
25. Yes.
26. Usual amount.
27. Good as usual.
28. No data.
29. June, July, and August; May, September, and October; January, February, and March; April, November, and December.
30. No month when the soil was *unusually* dry, I think.
31. November and December.
32. No data.
33. From 20 to 30 feet.
34. No data.
35. November and December.
36. January, February, and March.
37. No facts except such as I have sent you in previous reports.
38. In this locality proper drainage of cellars, cesspools, and low lands, especially swamp land, would, in my opinion, prevent a great deal of sickness, and in some cases no doubt save life. I have frequently found that wells are in close proximity to privies, even less than 20 feet distant, and in some cases the privies stood on higher land than the well and in sandy soil. If there could be some means devised by which the public could be educated on a few of these points, it would, I think, be of great value to them.

Very respectfully,

R. B. SMITH.

Webberville, Mich., March, 1880.

SOUTH-WESTERN DIVISION OF THE STATE.*

REPLIES BY MILTON CHASE, M. D., OF OTSEGO.

1. Village of Otsego. Number of inhabitants about 800.
2. From my record, which I suppose to be nearly correct, there were 15 in the village and 23 in the township outside of the village.
3. I include the village and township of Otsego and northwest part of Alamo, Kalamazoo county, the northeast part of Pine Grove, Van Buren county, the southwest part of Trowbridge, and south part of Watson, of this county, as this is the field of my practice.
4. Greater by about one-third.
5. I think above the average.
6. Diphtheria.
7. In 1879 we had in this locality the first epidemic of diphtheria that has been here in twelve years. From the fact that all the children under twelve years old had not been exposed to an epi-

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*For counties included in each division, see Exhibit 1, page 227.

demic of this kind, I infer that there were more persons susceptible to this disease than there would have been had we had an epidemic of diphtheria here six years ago. I am a believer in constitutional *susceptibilities* to epidemic diseases, and that they vary in different persons; that there are less persons susceptible to any epidemic for a period of time in a community that has just passed through an epidemic visitation. All this I believe to be somewhat independent of sanitary surroundings. Bad *sanitation* I think may increase susceptibility to epidemics. I do not think that in 1879 we were worse sanitarily than we were for two or three years before. I think that we were better in sanitation than we were eight years ago. The epidemic of diphtheria came to us in 1879. We were susceptible and we had it. [A fuller statement concerning this epidemic of diphtheria is given on pages 119-121 of the Report of the State Board of Health for 1879.—*H. B. B., Sec. S. B. of H.*]

8.* I guess none.

9. Nothing.

10. Diphtheria.

11. See answer 7.

12. Don't know of any.

14. Diphtheria. In May, 1; June, 2; July, 2; August, 1; September, 1; March, 6; April, 1; that I have a record of, and I have reason to think that there are more. The Health Officer of our township last year has kept no record. The Health Officer of village has kept one, and so have I as near as I could.

16. Diphtheria. See answer 14. There were many cases that did not die. I think the per cent of mortality about 40 per cent of the cases.

17. Diphtheria, about 150 cases in the locality defined under 3. From the other towns I have no data.

18. Small-pox and cholera. It is doubtful about the rest, except diphtheria, which did occur.

19. I think not.

20. *January:* Intermittent fever, rheumatism, consumption, diphtheria.
February: Influenza, bronchitis, rheumatism, intermittent fever, consumption.
March: Influenza, bronchitis, rheumatism, intermittent fever, pneumonia, consumption.
April: Influenza, bronchitis, intermittent fever, rheumatism, diphtheria, tonsilitis, consumption.
May: Intermittent fever, rheumatism, diphtheria, consumption.
June: Intermittent fever, diphtheria, rheumatism, consumption, diarrhea.
July: Intermittent fever, diarrhea, diphtheria, cholera morbus, rheumatism, scarlatina, remittent fever, influenza, consumption.
August: Intermittent fever, remittent fever, diarrhea, neuralgia, rheumatism, consumption.
September: Intermittent fever, remittent fever, diarrhea, diphtheria, consumption.
October: Intermittent fever, remittent fever, diarrhea, diphtheria, consumption.
November: Intermittent fever, influenza, rheumatism, bronchitis, diphtheria, consumption.
December: Remittent fever, intermittent fever, influenza, rheumatism, diphtheria.

21. No epidemic.

22. Much smut in corn. Rot among apples.

23. Much soft corn, more than usual; was "grown" in shook, and when husked and on the ground, and in the bin.

24. Think not.

25. I think drier than usual when threshed.

26. Probably less.

27. Well secured.

33. In village, about 16 feet. In township, one well is 127 feet.

MILTON CHASE, M. D.,
Otsego, Allegan Co., Mich., March 20, 1880.

REPLIES BY C. P. WELLS, M. D., OF POKAGON, MICH.†

1.* 2,000.

2. Have no statistics at hand upon which to base an estimate.

3. Pokagon Township.

4. About the same.

5. Same as average.

6. None particularly.

7. No unusual prevalence of any one disease.

8. Do not know of any less prevalent.

9. No lessened prevalence.

10. Nothing more than average mortality.

11. Cannot. No unusual mortality.

12 and 13. Cannot answer.

14. No such mortality here.

15. Do not know of such.

16. Nothing unusual.

17. Some scarlet fever, no fatal cases reported. No true typhoid fever. A few cases of typho-malarial fever. Some whooping-cough. Several cases of diphtheria reported. No mortality from that cause.

18. Small-pox, cholera, typhoid fever, measles, cerebral-spinal meningitis.

19. None except diphtheria in one school district.

20. *January:* Acute bronchitis 5, pneumonia 4, nephritis 2, diphtheria 2, erysipelas 2, consumption 1, senile gangrene 1.
February: Acute bronchitis 8, laryngitis 2, pneumonia 1.
March: Acute rheumatism 5, neuralgia 3, enteritis 1, acute bronchitis 1, lumbago 1, croup 1, pneumonia 1.
April: Intermittent fever 5, acute cystitis 2, neuralgia 2, ophthalmia 1, rheumatism 1, quinsy 1.
May: Intermittent fever 15, whooping-cough 6, hepatitis 1, purpura hemorrhagica 1, dropsy (anasarca) 1.
June: Intermittent fever 6, remittent fever 2.
July: Diarrhœa 6, intermittent fever 4, bilious fever 1, cholera morbus 1, sun-stroke 1, peracarditis 1, dysentery 1.
August: Intermittent fever 9, diarrhœa 5, dysentery 2, scarlet fever 1.

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* The figures beginning paragraphs refer to questions in Circular 38, printed (in small type) on pages 224-241 of this Report. A summary of the replies is printed on pages 224-243.

[† A reply to Circular 29, relative to diseases in Michigan in 1878, was received from Dr. C. P. Wells, of Pokagon, too late for publication. It contained the following statements: Population of Pokagon township, 2,500. The amount of sickness and the ratio of deaths to inhabitants were the same as the average. The lessened prevalence of pneumonia was attributed to less changeable weather during the cold months. The mortality from pneumonia also was lessened. He reported 14 cases of diphtheria, and 4 of whooping-cough, both in December. No cases of small-pox, scarlet fever, typhoid fever, measles, or cerebro-spinal meningitis. Some cases of dyspepsia, nothing unusual. Hog-cholera was present during Oct. and Nov., and a disease among horses not known, in Nov. and Dec., both to a limited extent. He reported some smut in wheat, and that a few early potatoes rotted. Grains were in good condition "when ready for market or use." Wheat was generally allowed to get thoroughly dry before being threshed, and hay was prime. The average depth of water in wells was 2 feet, and the depth of earth above ground-water was from 15 to 20 feet in valleys and 30 to 40 feet on high land, there never being much variation.—H. B. B., Sec. S. B. of H.]

September: Intermittent fever 18, remittent fever 3, diarrhœa 2, dysentery 2.
October: Intermittent fever 7, remittent fever 3, diphtheria 3, scarlet fever 2, diarrhœa 1.
November: Intermittent fever 5, neuralgia 4, diphtheria 3, croup 1.
December: Intermittent fever 3, neuralgia 3, scarlet fever 3, pneumonia 2, rheumatism 1, diphtheria 1. Influenza appeared during this month in this vicinity, but not as an epidemic.

21. There has been some mortality among horses, but I cannot arrive at anything definite as to the nature of the disease, no competent veterinary surgeon being accessible.
22. None.
23. Good.
24. No.
25. It was.
26. Less.
27. Perhaps less, if any difference.
28. Cannot.
29. Cannot. Driest during August and September.
30. August and September.
31. November and December.
32. Cannot.
33. 15 to 20 feet along low lands and near streams of water, 30 to 40 feet on uplands.
34. Cannot say.
35. Probably in Nov. and Dec.
36. August and September.
37. Disregard of sanitary regulations.
38. Sanitary rules as recommended by the State Board of Health relative to the spread of contagious diseases are more generally understood and adopted, hence such diseases have not spread to an alarming extent in this locality for several years.

Very respectfully yours,
C. P. WELLS.
Pokagon, Mich., May 1, 1880.

SOUTHERN-CENTRAL DIVISION OF THE STATE.*

REPLIES BY MARDEN SABIN, M. D., OF CENTREVILLE, MICH.

1. Incorporated village of 1,000 inhabitants.
2. I estimate the number of deaths at 15; there are no accurate records.
3. The locality for which I report is the village of Centreville and the township of Nottawa.
4. I think less than the average of previous years by about 10 per cent.
5. Less than usual, by 25 per cent.
6. Diphtheria was more prevalent in our township than usual.
7. Drying up of a millrace and millpond with prevailing winds carrying poison to affected district.
8. Low grades of fever, as typhoid and typho-malarial.
9. Accidental; better hygienic condition in homes.
10. From none.
11. No unusual mortality from any disease.
12. Diphtheria.
13. Mildness of the epidemic.
14. No unusual rate of mortality.
15. From August 10 to December 20 diphtheria prevailed with low rate of mortality.
16. There has not been an epidemic of diphtheria in this locality for the past 12 years, till it commenced about August 10, and continued till near the beginning of the present year.
17. No small-pox, scarlet fever, or cholera; probably 4 or 5 cases of typho-malarial fever; no measles or whooping-cough reported though there were some rumors of a few cases of each; two cases of cerebro-spinal meningitis, and 33 cases of diphtheria.
18. Small-pox, cholera, scarlet fever.
19. Not appreciably.
20. *January:* Fever intermittent, bronchitis, fever remittent, tonsilitis, neuralgia, rheumatism.
February: Fever intermittent, bronchitis, pneumonia, neuralgia, tonsilitis.
March: Fever intermittent, fever remittent, bronchitis, neuralgia, cerebro-spinal meningitis.
April: Fever intermittent, bronchitis, neuralgia, rheumatism, consumption.
May: Fever intermittent, tonsilitis, neuralgia, bronchitis, consumption.
June: Fever intermittent, fever remittent, tonsilitis, bronchitis, consumption.
July: Fever intermittent, fever remittent, neuralgia, rheumatism, tonsilitis, diarrhea.
August: Fever intermittent, fever remittent, diarrhea, cholera morbus, diphtheria, influenza.
September: Fever remittent, tonsilitis, diphtheria, diarrhea, influenza, bronchitis.
October: Fever remittent, fever intermittent, diphtheria, tonsilitis, diarrhea, rheumatism.
November: Fever remittent, fever intermittent, tonsilitis, diphtheria, neuralgia, rheumatism.
December: Fever intermittent, fever remittent, bronchitis, rheumatism, neuralgia, diphtheria.
21. Slight recurrence of "hen cholera" in November.
22. No disease noticed among crops in this locality except a slight increase of smut among corn; apples fell off prematurely, and potatoes of some varieties were somewhat injured by furrows of dry rot.
23. Oats and corn were in good condition for market; wheat was rather damper than usual; rye and buckwheat not observed.
24. No, except more smut than usual among corn.
25. No.
26. A greater proportion than usual of wheat liable to *bank* in bin.
27. No more than usual.
28. No meteorological observations made.
29. Have no data by which to answer as desired. During the summer there was no continuous drouth in this locality. Rains came frequently, though not at any time excessively. It was eminently a "growing season."
30. At no time.
31. July and September.
32. The depth of water in wells is from 2 to 4 feet, and has not varied materially during the past year.
33. Fourteen feet.
34. The distance to water in wells, streams, etc., has not changed as much as usual during 1879, and is at no time liable to great variations. During the year I think the distance will range from 13 to 17 feet.
35, 36. At no time.
37. As explaining a *possible cause* of an epidemic of diphtheria, I mention the following facts: In the month of August a long line of mill-race was allowed to run dry and remained so about ten days. The course of the race was from southeast to northwest. The prevailing winds at that time were from the southwest. An epidemic of diphtheria broke out in about two weeks after this occurrence in the neighborhood lying to the north and east of this race, which continued with diminishing virulence till the middle of December. There had been no cases

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*For counties included in each division, see Exhibit 1, page 227.

of diphtheria in this section for at least twelve years, and no evidence of exposure to contagion could be found.[*]

38. How to secure reports to local authorities of cases of diseases dangerous to public health has been a subject of thought with me. My own experience as health officer has been that where a local paper is published there should be set forth at least quarterly the sections of the law on that point with the duties of officers in that regard. This course has secured reports more promptly with us than the distribution of blanks for that purpose through the postoffice.

Very truly yours,
MARDEN SABIN, M. D.
Centreville, Mich., April 22, 1880.

REPLIES BY JOHN W. FALLEY, M. D., OF HILLSDALE, MICH.

1.[†] A city; 4,500.

3. City of Hillsdale.

4. Less. Deaths and severe sickness one-third to one-half less.

5. One-third less than the three previous years.

6. None.

7. Greater humidity of atmosphere and extreme heat, giving a great amount of bilious troubles, half-fledged agues, etc., but few serious cases.

8. Scarlatina, and diphtheria especially.

9. Almost entire absence of any contagious disease.

10. None.

11. None.

12. From contagious diseases which had held us for three years.

13. See answers to 2 and 9.

14. There were none.

15. 1879 was unusually free from mortal sickness. In the Winter and Spring a few cases of pneumonia. Few indeed were the deaths. In the Fall a few cases of severe fevers. Several typho-malarial. Deaths, except with aged or invalids, almost none.

16. There were none.

17. None,—except in Winter and Spring a few mild cases of diphtheria and scarlatina (as it was leaving us), a few isolated cases of measles and whooping-cough.

18. Small-pox, cholera, cerebro-spinal meningitis. Some cases of fever probably were called typhoid. I know of none.

19. No.

20. *January, February, March, April, and May:* Pneumonia, rheumatism, neuralgia, diphtheria, scarlatina, and fevers. Usually very mild.
June and July: Almost nothing.
August, September, and October: A good deal of bilious troubles, but little severe sickness.
November and December: Almost nothing.

21. I know of no epidemics. Nothing but ordinary and occasional sickness.

22. None. Large crops of almost everything.

23. Full average in all good qualities.

24. No.

25. It was in extra fine condition.

26. I heard of none.

27. Hay cut early was injured. After the 5th of July almost none was injured.

28. January, February, and March, rather mild; April and May, wet, cold spells, injuring the fruit very much; June, very hot, much rain; July, August, and September, very hot with more than usual amount of damp weather; October, November, and December, good months in every way.

29. August, July, September, driest; October and November, good; April, May, June, wet; taken together the season could hardly have been better for fruitfulness, except a little too cold in May.

30. There was no suffering from drouth in any month.

31. Rather more than usual in April and May.

32. Our wells are usually from 30 to 80 feet deep, and not easily affected by drouth or floods.

33. On the flats along the St. Joseph river, from 25 to 35 feet; on either side 40 to 80 feet.

34. In the shallower wells (as above), many vary 4 to 6 feet, leaving the depth of earth above water 20 to 26 feet. The deep wells are very little affected by floods or drouths.

35. April, May, and June, rather high.

36. Was not as low as usual.

37, 38. The greatest trouble that I fear in our place is the difficulty of drainage. The surface drainage is very perfect. In fact we have no wet land except along the banks of the St. Joseph river. The north side of the river is a deep gravelly deposit. The ground is occupied entirely for dwellings, and the lots are usually so large that the water is pure, and no sewers are needed. On the south side the soil is a gravelly clay, underlaid within a few feet with shale rock. Here are all the business blocks and many dwellings. Quite a large space is nearly level, where the water would percolate slowly through the seams of the rock. From this place the rock dips south-west and north-east. To sewer through this shale rock so as to drain the privies is nearly impossible. In most of the private privies the vaults are not deep enough to go much into the rock, but held in the hard clay; while all public, and many private ones are dug several feet into the rock, and the fluids filter or run off through the seams, no one can tell where. The time is not far off when we shall be compelled to use absorbents and remove all fecal accumulation from a part of our little city, or drink what it is not pleasant to contemplate at teatime.

Most respectfully submitted,
JOHN W. FALLEY.
Hillsdale, Mich., April 5, 1880.

REPLIES BY A. R. SMART, M. D., OF HUDSON, MICH.

1.[†] 3,000.

2. 48.

3. A radius of 3 miles from Hudson.

4 and 5. Slightly increased.

6. Pneumonias and pulmonary diseases in general.

7. Unusual and rapid changes in the temperature.

8. Bowel diseases, scarlatina and diphtheria.

9. Do not know.

10. Pulmonary disorders.

11. Atmospheric conditions as above.

12. Do not know.

14 and 15. Nothing except as noted. Pulmonary disease most prevalent during Winter and Fall months; whooping-cough during Summer and Fall.

16. Had none.

17. No small-pox or cholera; but little scarlatina; little typhoid fever. An epidemic of measles in the vicinity of Hudson during the Winter. More than usual of whooping-cough. No cerebro-spinal meningitis. A little diphtheria—not over a dozen cases within a radius of 10 miles. Have no means of knowing the exact number of cases in any of above diseases.

19. Has spread whooping-cough and measles.

20. Cannot be more specific than already stated.

21. Have had none of any amount.

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[*] For a description of this epidemic see pages 115-117 of the Report of the Michigan State Board of Health for 1879.

[†] The figures beginning paragraphs refer to questions in Circular 38, printed (in small type) on pages 224-241 of this Report. A summary of the replies is printed on pages 224-243.

22. None, except apples rotted unusually, as did potatoes to some extent.
23. Good, as a rule.
24. No.
25. Yes.
26, 27. Less.
28. Have no data concerning it.
29. Most wet during winter months.
30. September and October.
31. November, December, 1879, and Jan'y, 1880.
32. From 2 to 6 feet.
33. In some localities, 6 to 8 feet; in others, 15 to 20. Perhaps in most cases 15 feet, often 30.
34. Cannot tell.
35. During months above stated.
36. As above during dry weather.
37 and 38. Have nothing to offer.

Yours,
A. R. SMART, M. D.
Hudson, Mich., March, 1880.

REPLY BY W. L. WORCESTER, M. D., ASYLUM FOR INSANE, KALAMAZOO, MICH.

During the year 1879 we had no case of any of the diseases mentioned in question 17 of your circular, or of any other epidemic, contagious, or infectious disease. So far as I am aware, there was not a case of sickness of any sort that could fairly be attributed to unfavorable hygienic conditions, unless a few mild cases of malarial fever should be so considered.

One item in our experience may be of some interest as bearing upon the idea still entertained by many, that fresh fruits and vegetables have a tendency to produce diarrhœa. The area devoted to garden vegetables last Summer was much greater than ever before, and the consumption was correspondingly increased. During the whole season there was nothing at any time approaching to an epidemic of diarrhœa; the number of cases was smaller than for several years previous, and the few cases which occurred were all of a very mild character. While it might, perhaps, be hardly safe to ascribe our exemption from such complaints to the free use of vegetables, it certainly seems evident that their effect cannot have been injurious to any considerable extent.

We had, during the past year, twenty-three deaths, mostly from chronic diseases, out of an average population of about six hundred. As the conditions here are so exceptional, I presume you would not care for a tabulated statement of the causes of death. If it would be of interest, I should be happy to furnish it.

Respectfully,
W. L. WORCESTER.
Michigan Asylum for Insane, Kalamazoo, March 22, 1880.

REPLIES BY H. C. CLAPP, M. D., OF MENDON, MICH.

1.† About 1,000.
2. 10.
3. A radius of five miles.
4 and 5. About the same.
6. None.
8. Malarial.
9. Continued drainage of marshes, and a still greater exhaustion of *vegetable matter* so abundant in virgin soil.
10. None.
12. None, unless we except malarial.
16. None.
17. Scarlet fever 3, whooping cough *many*, diphtheria 3, typhoid fever 1.
18. Small-pox, cholera, measles, cerebro-spinal meningitis.
19. Whooping cough.
20. *January:* Bronchitis, whooping-cough, pneumonia, remittent and intermittent fevers, rheumatism, neuralgia, consumption.
  February: Bronchitis, influenza, pneumonia, intermittent and remittent fevers, neuralgia, rheumatism, tonsilitis, hepatitis, consumption.
  March: Bronchitis, pneumonia, influenza, neuralgia, intermittent and remittent fevers, rheumatism, tonsilitis, hepatitis, consumption.
  April: Bronchitis, pneumonia, intermittent and remittent fevers, neuralgia, rheumatism, tonsilitis, influenza, consumption, typhoid fever.
  May: Remittent and intermittent fevers, bronchitis, pneumonia, neuralgia, rheumatism, consumption, peritonitis.
  June: Intermittent and remittent fevers, bronchitis, rheumatism, neuralgia, consumption, pneumonia, splenitis.
  July: Intermittent and remittent fevers, bronchitis, rheumatism, neuralgia, consumption, diphtheria, erysipelas, dysentery.
  August: Intermittent and remittent fevers, diarrhea, dysentery, cholera morbus, bronchitis, rheumatism, consumption, erysipelas.
  September: Intermittent and remittent fevers, diarrhea, cholera morbus, dysentery, bronchitis, neuralgia, rheumatism.
  October: Intermittent and remittent fevers, bronchitis, diarrhea, neuralgia, dysentery, consumption, rheumatism.
  November: Intermittent and remittent fevers, bronchitis, mumps, neuralgia, rheumatism, consumption.
  December: Bronchitis, intermittent and remittent fevers, mumps, neuralgia, rheumatism, consumption.
21. Cholera among hogs in September, October, and November, and during the same time a disease among hens, not understood and quite fatal.
22. Potatoes rotted in a few localities, but no unusual sickness in those localities; other crops healthy.
23. Good.
24. No more than usual.
25. Yes.
26. I think *less*.
27. No.
28, 29, 30, 31, 32. No data.
33. About 17 feet.
34, 35. No data.

Respectfully submitted,
H. C. CLAPP, M. D.
Mendon, St. Joseph Co., Mich., March 15, 1880.

REPLIES BY C. M. WOODWARD, M. D., OF TECUMSEH, MICH.

1. †3 000.
2. 33.
3. Village of Tecumseh.
4. Diminished one-fourth.
5. Diminished one-eighth.
6. Scarlatina.
7. Contagion of scarlatina.
8. Typhoid fever.
9. To better sanitation.
10. Scarlatina.
11. Unknown.
12. Typhoid and typho-malarial fever.
13. To the lessened number of cases and better sanitation.
17. Scarlet fever, 33; typhoid fever, 2; diphtheria, 3.
18. Small-pox, cholera, measles, whooping-cough, cerebro-spinal meningitis.
19. Scarlatina, probably.
20. Scarlatina, April 27, 1; May, 13; June, 2; July, 8; August, 7; September and October, none; November, 1; December, none. Diphtheria, May, 1; July, 1; December, 1. Mumps, June, 3. Typhoid fever, September, 1; October, 1.

21. Do not know of any.

22. Apples rotted. Rust in wheat; straw slight in some crops.

23. Oats inclined to mould; other grains in good order.

24. Not aware of any.

25. Yes.

26. Usual proportion.

27. Same as usual.

28 and 29. Unable to do so.

30 and 31. Have no data.

32. About 8 feet.

33. 16 to 18 feet.

34. Have no records for each month.

35 and 36. Do not know.

Very respectfully,
C. M. WOODWARD.
Tecumseh, Lenawee County, April, 1880.

REPLIES BY C. W. BACKUS, M. D., OF THREE RIVERS, MICH.

1. *Incorporated village, 3,000.

2. About 21 or 22.

3. Village of Three Rivers.

4. Less, by about one-fourth.

5. Less, about 2 per cent.

6. Not any.

8. Malarial.

9. Favorable meteorological changes and dry seasons.

10. None.

12. Malarial.

13. Same as in answer 9.

14. None prevailing with an unusual high rate of mortality.

16. Know of none specially.

17. 4 cases of diphtheria, 24 of scarlet fever. Whooping-cough prevailed in the early Spring, mild; no means of estimating, but it was not general; probably 30 cases. No other infectious or endemic diseases prevalent during 1879.

18. Small-pox, cholera, typhoid fever, measles, cerebro-spinal meningitis.

19. Yes, in Second ward; spread scarlet fever.

20. *January:* Intermittent fever, bronchitis, influenza, pharyngitis, neuralgia, rheumatism.
    February: Bronchitis, influenza, intermittent fever, pharyngitis, neuralgia, pneumonia.
    March: Bronchitis, influenza, intermittent fever, neuralgia, rheumatism, tonsilitis, pneumonia.
    April: Bronchitis, intermittent fever, influenza, catarrh, rheumatism, neuralgia.
    May: Intermittent fever, bronchitis, remittent fever, influenza, catarrh, neuralgia.
    June: Intermittent fever, remittent fever, bronchitis, influenza, rheumatism, diarrhea.
    July: Intermittent fever, remittent fever diarrhea, bronchitis, influenza.
    August: Intermittent fever, remittent fever, diarrhea, cholera morbus, influenza.
    September: Intermittent and remittent fevers, diarrhea, influenza, bronchitis, neuralgia.
    October: Intermittent and remittent fevers, influenza, bronchitis, neuralgia, diarrhea, rheumatism.
    November: Intermittent and remittent fevers, bronchitis, influenza, neuralgia, pharyngitis, catarrh.
    December: Intermittent and remittent fevers, bronchitis, neuralgia, influenza, catarrh, pneumonia, pharyngitis.

21. None in this locality.

22. All in good condition.

23. Corn soft and some mould. Wheat that was in stack long and threshed late grown some, but generally could not have been better.

24. No.

25. Yes.

26. About the same as usual.

27. None.

29. May, August, September, July, June, Fall months wet; Winter and Spring snow.

30 and 31. None.

32. 4 to 6 feet.

33. About 20 to 22 feet in wells; does not vary much.

34. Did not observe it monthly.

35. April and December.

36. June and August.

Respectfully yours,
C. W. BACKUS.
Three Rivers, St. Joseph County, April 26, 1880.

REPLIES BY NELSON H. CLAFLIN, M. D., OF UNION CITY, MICH.

1.* Union City, Branch Co. 1,300.

2. 13. (Taken from the record at the only undertaker's in the village).

3. About six miles each way from the Village of Union City.

4. Less ¼ or ⅓.

5. Less ⅓.

6 and 7. None.

8. Typho-malarial fever.

9. Improved drainage and clearing of land.

10 and 11. None.

12. Typho-malarial fever.

13. Same as answer No. 9.

14, 15 and 16. None.

17. Scarlet fever 1, typhoid fever 8 or 10, whooping cough 300 or 350, diphtheria 8 to 15. (These are facts as near as I can ascertain from personal knowledge and inquiry of other physicians).

18. Small-pox, cholera, measles, and cerebro-spinal meningitis.

19. Yes. Whooping-cough.

20. Am unable to give it for the year.

21. None. (Said to have been a few cases of hog cholera).

22. None. (Plenty of potato bugs).

23. Very good.

24. Corn about as usual by smut. No others.

25. Yes.

26. Know of none. It is very unusual here.

27. None at all, except clover about as usual.

28. Cannot. Ozone 1 to 7. More in night than day and in cold than warm weather (so Dr. Brumfield says).

29. Oct., Nov., Dec., dry; Apr., May, June, next. July, Aug., Sept., average wet. Jan., Feb., Mar., wet.

30. None.

31. Jan., Feb., March.

32. Wells average 45 feet deep. Water in them five feet deep. A few on the flats by the river are 12 to 16 feet deep, and the water standing in them within 5 feet of the surface of the ground.

33. 40 feet. A very few 7 to 12 feet.

34. Cannot estimate by months; varies from 35 to 42 feet, except on flats by the river.

35. Jan., Feb., and March.

36. Oct., Nov., and Dec.

37. None to communicate.

38. Remove decaying vegetables from cellars and arrange the cellars to allow a frequent change of air. Guard against foul drinking-water, from slops thrown on surface near wells, from privy, etc. Ventilate houses better *day* and *night*, and take more care in the preparation of *plain*, wholesome food.

Yours truly,
NELSON H. CLAFLIN, M. D.
Union City, Branch Co., June 8, 1880.

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* The figures beginning paragraphs refer to questions in Circular 38, printed (in small type) on pages 224-241 of this Report. A summary of the replies is printed on pages 224-243.

REPLIES BY S. C. VAN ANTWERP, M. D., OF VICKSBURG, MICH.

1.* Village of Vicksburg; 800 inhabitants.

2. Six deaths, 3 of persons 60 years of age and over.

3. Village of Vicksburg.

4. Average same.

5. Diminished.

6. None.

7 to 15. No answer, as there was nothing unusual in that way.

16. During the latter part of the year there was a form of spurious tonsilitis similating diphtheria; tonsils much swollen, never suppurating however; some mucous patches over them, and in posterior part of throat; slight febrile action, remittent in form. Not fatal, but mistaken in a number of cases for diphtheria.

17. None, with the exception of one case of diphtheria, and a few cases of whooping-cough.

18. None, except those answered in 17 occurred, viz.: whooping-cough and one case of diphtheria were the only ones which were present.

19. No.

20. The diseases most prevalent were of malarial nature.

21. None that I know of, to any extent.

22. None; especially good crops and well secured.

23. Good.

24. Were not.

25. Yes.

26. Less amount.

27. Less.

28. Did not notice anything unusual; just sufficient moisture to make good crops.

29. Made no record.

30, 31, 32. Don't know.

33. Fourteen feet. Not much variation as regards depth.

34. About the same.

35 and 36. About the same as other years.

37. The past season has been a healthful one in this vicinity. We have been exempt from fatal disorders to a great extent. In our experience the soil has much to do with this, being of a sandy nature. The stream is also clear and fed by springs, so that our millpond is not a source of disease. Owing to the open Winter of 1879 and 1880, and the sudden changes of temperature, there have been a good many cases of influenza and common colds and sore throat. In cases where diphtheria has been most prevalent in the localities about us, I find there is a damp, cold soil, either upon the surface or underneath a few feet.

Respectfully yours,
S. C. VAN ANTWERP.
Vicksburg, Kalamazoo Co., March 20, 1880.

SOUTH-EASTERN DIVISION OF THE STATE.†

REPLIES BY JUDSON BRADLEY, M. D., OF DETROIT, MICH.

1. 125,000.

2. 1,500.

3. City of Detroit.

4. About the same.

5, 6, 8, 10, 12, 14, 15, and 16. Same.

17. No data.

19. Whooping-cough, scarlet fever, measles.

I have delayed somewhat in answering the circular. I hoped to get at some of the answers more perfectly, but owing to the loose condition of city officialism it seems impossible to arrive at the truth in anything.

Living in the city I am unable to answer from 21 to 36 inclusive. For 37 and 38 I have no demonstrable facts other than the general statement under 19.

Yours truly,
JUDSON BRADLEY.
1081 Jefferson Ave., Detroit, Wayne Co., Mich., May 25, 1880.

REPLIES BY W. H. ROUSE, M. D., P. C., OF DETROIT, MICH.

1.* Detroit 115,070 (U. S. census of 1880); Hamtramck and Springwells, practically a part of the city, 12,109, making a total of 127,179.

2. About 2,192—the number of interments in the Detroit cemeteries. Some of these were brought from the country, while some were taken away from the city for interment.

3. The City of Detroit, principally.

4. About the average, but probably somewhat less.

5. Nearly an average, but greater in number than in 1877 and 1878. See table B, pages 256–8.

6. Diseases of the throat, especially a follicular tonsilitis, variously called diphtheria, influenza, sore throat, etc. This disease, though quite prevalent, did not appear to be particularly contagious, or possibly not at all, and caused but few deaths in proportion to the number afflicted. Measles of a remarkably light type was unusually prevalent during the latter part of the year. Consumption seemed rather more than ordinarily fatal during December. Pneumonia, bronchitis, and other diseases of the respiratory organs were prevalent several times during that year. Neuralgia, diseases of the brain and head, were slightly above the average.

7. I have not been able to determine the cause of the "throat" disease. It has been more or less prevalent since the great epizootic among horses in 1872. It is not improbable some of the increase of the diseases of the respiratory organs, heart and nervous system, have arisen from the same cause. The city has been comparatively exempt from measles for several years, and but little or no effort was made to prevent contagion, on account of the mild type, many people believing it a good time to have measles.

8. Scarlatina, small-pox, chicken-pox, and fevers.

9. Scarlet fever having been more or less prevalent for several years, has had comparatively little material. Small-pox has been reported several times since the general vaccination in 1877, but these reports were in most cases false, and no deaths have occurred. Whether the absence of small-pox was due to care in vaccinating, or to other causes, it is not easy to determine. The coincidence is suggestive. There has been a gradual decrease in typhoid fever since the inlet pipe of the water-works has been removed above the outlet of the sewers. Most of the cases I have seen were parties brought to the city while sick, the disease having been contracted elsewhere.

10. Consumption, diphtheria, croup, puerperal fever, and debility. See table B, pages 265–8.

11. The causes of increase are not evident. The mortality from consumption is supposed by some to bear some relation to the humidity of the air. The following table gives the relative and the absolute humidity of the atmosphere in 1879, and the interments in Detroit cemeteries, in 1879, of persons who died from consumption.

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† For counties in each division, see Exhibit 1, page 227.

TABLE A.—*Exhibiting, for the City of Detroit, Michigan, by Months during the year 1879, the Relative and the Absolute Humidity—determined from observations by Theo. V. Van Heusen and C. F. R. Wappenhaus, Sergts. Signal Corps U. S. A.,—and the Deaths from Consumption, as indicated by the Interments Recorded in the Office of the City Clerk.*

	Months, 1879.												
	Average.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Relative Humidity........*	70	76	71	71	61	59	68	68	67	72	73	77	82
Absolute Humidity.........†	3.48	1.24	1.15	1.98	2.60	3.94	5.23	6.32	5.68	4.42	4.71	2.59	1.88
Deaths from Consumption.	20.08	11	21	21	31	19	15	19	17	21	18	22	26

* 100 represents complete saturation of the air.
† Number of grains of vapor in a cubic foot of air.

12. Scarlet fever, typhoid fever, pneumonia, and whooping-cough.

13. From scarlet fever and whooping-cough, from lack of fresh material; typhoid fever, from better quality of water; pneumonia, cause not obvious.

14, 15. It is impossible to give the number of cases of different diseases. The nearest approximation is the returns of interments in the city cemeteries as given by the superintendents. From these reports on file in the office of the City Clerk, the subjoined tables B, C, D, and E, have been compiled.

TABLE B.—*Exhibiting, for the City of Detroit, Michigan, by Months during the Year 1879, and by Totals for the Years 1876–9 inclusive, the Number of Interments, and the Reported Causes of Deaths; also the Increase or Decrease from each Cause in 1879 as Compared with 1878.—Compiled from the Reports of the Superintendents of Cemeteries, on file in the office of the City Clerk.*

DISEASES AND CAUSES OF DEATHS.	Months, 1879.												Total Interments, by Years.				In 1879 More (+), or Less (—), than in 1878.
	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	1879	1878	1877	1876	
ALL CAUSES........	165	178	180	172	148	132	267	237	195	154	164	200	2192	1909	2105	2217	+283
Accident	3	3	0	2	5	5	4	6	2	4	2	5	41	29	24	49	+12
Burned..............	----	2	----	3	1	1	----	----	----	----	2	----	9	----	----	----	+9
Drowned	----	----	----	----	2	3	8	8	1	----	----	----	22	22	17	15	0
Asthma...............	2	2	3	----	1	----	1	2	----	----	----	----	11	8	7	7	+3
Asphyxia..............	1	----	----	----	----	----	3	----	1	----	----	----	5	3	4	4	+2
Abscess...............	----	1	----	2	----	----	1	1	----	1	----	----	6	13	6	2	—7
Apoplexy	3	4	3	1	4	1	2	4	3	2	3	1	31	32	22	9	—1
Aphthæ	----	----	----	----	----	----	2	1	----	----	----	1	4	3	1	2	+1
Bowels, Disease of.	----	----	----	----	----	----	----	----	----	1	----	----	1	----	----	----	+1
Inflammation of..	----	5	---	----	----	----	10	3	3	2	1	1	25	----	----	----	+25
Congestion of.....	----	1	----	----	----	----	----	1	----	----	----	----	2	----	----	----	+2
Peritonitis of.....	3	---	1	2	5	4	----	----	----	1	3	----	19	42	26	----	—27
Cholera Morbus....	----	----	----	----	----	----	4	----	----	1	----	----	5	9	8	----	—4
Cholera Infantum, etc.................	1	----	1	----	2	8	68	34	17	5	----	2	138	103	148	225	+35
Diarrhea..............	----	----	1	----	2	2	15	7	4	2	----	----	33	23	27	46	+10
Dysentery...........	----	1	----	----	----	2	2	6	2	----	1	1	15	4	13	20	+11
Brain.................	2	1	----	----	1	----	1	1	----	2	----	1	9	9	1	----	0
Inflammation of..	1	1	4	4	----	----	5	1	1	2	1	3	23	19	25	45	+4

TABLE B.—CONTINUED.—*Interments in Detroit, in 1879, 1878, 1877, and 1876.*

DISEASES AND CAUSES OF DEATHS.	MONTHS, 1879.												TOTAL INTERMENTS, BY YEARS.				In 1879 More (+), or Less (—), than in 1878.
	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	1879	1878	1877	1876	
Brain—*Continued.*																	
Meningitis of	2	1	1	2	2	2	10	----	2	1	1	2	26	28	38	12	—2
Tubercular Meningitis of	----	----	----	----	----	----	----	1	----	----	----	----	1	----	2	4	+1
Softening of	----	1	----	----	----	----	1	----	----	1	----	1	4	----	10	6	+4
Congestion of	3	1	3	2	----	2	2	2	3	4	----	2	24	16	34	41	+9
Hydrocephalus	3	----	3	7	1	3	4	2	2	----	----	2	27	20	25	15	+7
Cancer	2	2	3	1	2	1	3	6	2	2	2	6	32	24	43	24	+8
Confinement, Child-Birth	----	----	----	1	----	1	----	----	----	----	----	2	4	4	6	9	0
Congestion	----	----	1	1	1	----	----	----	5	1	1	2	12	6	13	20	+6
Convuls'ns, Cramps, etc.	12	22	14	13	6	9	12	33	9	10	13	11	164	131	173	176	+33
Croup	7	2	5	1	1	1	2	2	3	7	4	9	44	35	38	38	+9
Membraneous	2	----	1	2	----	----	----	----	1	3	5	5	19	----	----	----	+19
Debility	3	3	6	8	3	8	11	10	5	6	7	13	83	44	49	79	+39
Diphtheria	7	2	3	4	----	2	8	5	17	14	15	17	94	47	54	30	+47
Dropsy	2	3	3	4	2	3	4	2	5	1	2	----	31	34	31	31	—3
Died at Birth	----	----	----	----	----	----	----	----	----	----	1	----	1	----	3	5	+1
Delirium Tremens	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	2	--------
Erysipelas	----	1	2	2	1	----	1	----	----	----	----	1	8	9	7	----	+8
Fever	1	1	2	2	1	2	1	1	----	----	----	----	11	5	12	----	+6
Intermittent	----	1	----	----	----	----	----	----	----	----	----	----	1	1	5	10	0
Remittent and Bilious	----	----	----	----	----	----	1	6	3	----	1	----	11	13	25	16	—2
Typhoid	----	2	----	2	----	1	3	7	2	5	2	1	25	27	49	40	—2
Typhus	----	1	----	----	----	----	----	----	2	----	----	----	3	----	3	8	+3
Typho-Malarial	----	----	----	----	1	----	----	2	2	1	2	----	8	2	1	----	+6
Cerebro-Spinal	1	----	4	----	----	1	1	1	----	----	1	3	12	1	4	2	+11
Yellow	----	----	----	----	----	----	----	----	----	----	----	----	----	1	----	----	—1
Puerperal	1	2	3	----	2	4	----	3	1	2	2	3	23	16	9	9	+7
Puerperal Convulsions	----	----	----	----	----	----	----	----	----	2	1	----	3	2	4	3	+1
Scarlatina	16	18	11	6	10	1	1	1	5	2	5	5	81	103	75	18	—22
Small-pox	----	----	----	----	----	----	----	----	----	----	----	----	----	----	107	55	-------
Measles	1	----	----	2	----	----	3	4	1	2	----	8	21	1	2	40	+20
Frozen	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	----	-------
Gravel	----	----	----	----	----	----	----	----	1	----	----	----	1	1	1	----	0
Heart-Disease	9	9	3	1	5	2	3	5	5	2	5	2	51	47	62	52	+5
Dropsy of	1	----	1	----	1	2	----	----	----	----	1	----	6	5	1	5	+1
Endocarditis	1	----	----	----	----	----	----	----	----	----	----	----	1	----	----	----	+1
Pericarditis	----	2	----	----	----	----	----	----	----	----	2	----	4	----	----	----	+4
Carditis	----	----	----	----	----	----	1	----	1	----	----	----	2	----	----	----	+2
Hemorrhage	----	----	----	----	1	----	----	1	1	2	2	----	7	----	----	----	+7

TABLE B.—CONTINUED.—*Interments in Detroit, in 1879, 1878, 1877, and 1876.*

DISEASES AND CAUSES OF DEATHS.	MONTHS, 1879.												TOTAL INTERMENTS, BY YEARS.				In 1879 More (+), or Less (—), than in 1878.
	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	1879	1878	1877	1876	
Inanition	1	----	----	----	----	----	3	----	1	----	2	----	7	7	7	10	0
Insanity, Dementia.	----	----	----	----	2	----	----	----	----	----	----	----	2	7	1	3	—5
Influenza	----	1	----	1	----	----	----	----	2	1	----	----	5	2	----	----	+3
Jaundice	----	----	----	----	----	1	----	----	1	----	1	----	3	4	----	----	—1
Kidney	----	----	----	2	4	----	----	----	1	4	----	1	12	----	----	----	+12
Albuminuria, Bright's	1	2	1	1	----	5	----	2	1	1	1	----	15	10	8	21	+5
Liver Disease	2	1	----	1	1	----	1	----	2	----	----	----	8	9	10	17	—1
Inflammation of	9	2	----	13	1	----	3	----	1	----	----	----	29	6	----	----	+23
Hypertrophy	----	----	1	----	1	----	----	----	4	----	----	----	6	2	----	----	+4
Atrophy	----	----	----	----	----	----	1	----	----	----	----	----	1	----	----	----	+1
Lungs, Disease of	----	1	----	----	----	----	----	----	----	----	1	1	3	11	10	13	—8
Consumption	11	21	21	31	19	15	19	17	21	18	22	26	241	184	163	210	+57
Pneumonia	1	13	15	4	10	8	1	5	----	5	7	10	79	99	85	130	—20
Congestion of	2	2	6	----	2	----	1	----	4	1	1	4	23	24	27	28	—1
Hemorrhage of	----	----	1	----	----	----	----	----	----	----	----	----	1	----	----	----	+1
Bronchitis	3	4	10	7	5	2	3	1	2	1	5	12	55	36	31	22	+19
Laryngitis	----	----	----	1	----	----	----	----	----	----	----	----	1	----	4	----	+1
Marasmus	1	1	2	----	3	1	6	6	4	----	2	1	27	26	18	25	+1
Nervous Exhaust'n	----	----	----	----	----	----	----	----	----	----	----	----	----	----	5	----	--------
Old Age	10	7	6	7	3	4	2	3	5	3	1	5	56	65	61	46	—9
Paralysis	1	2	4	1	2	----	1	2	----	1	----	----	14	22	22	20	—8
Pleuritis	----	----	----	----	----	----	----	----	----	----	----	----	----	2	11	10	—2
Pharyngitis	----	----	----	----	3	----	----	----	----	----	----	----	3	----	1	----	+3
Premature Birth	1	----	----	1	1	2	1	3	1	1	2	4	17	23	14	----	—6
Pyæmia	2	1	----	----	----	1	----	----	----	----	----	----	4	----	----	----	+4
Rheumatism	1	----	1	2	----	1	----	----	----	----	----	----	5	3	6	6	+2
Stomach	----	----	----	----	----	----	----	----	----	----	----	2	2	----	----	----	+2
Gastritis	----	1	1	----	2	----	----	1	4	3	2	3	17	16	11	----	+1
Scrofula	----	----	----	----	----	----	----	----	1	----	----	----	1	3	3	8	—2
Spinal Disease	----	----	----	----	----	----	----	----	----	----	----	----	----	4	9	8	—4
Suicide	1	----	----	1	----	2	2	1	----	----	1	1	9	11	11	5	—2
Sun-Stroke	----	----	----	----	----	----	----	----	----	----	----	----	----	4	----	----	—4
Still-Born	13	11	7	9	14	8	13	8	15	8	13	12	131	147	131	185	—16
Teething	----	----	1	2	1	----	1	3	3	1	1	----	13	13	11	21	0
Tumors	----	----	----	1	----	----	1	----	----	1	----	----	3	4	7	7	—1
Whooping-cough	----	----	----	----	----	----	----	----	----	----	----	1	1	33	13	21	—22
Unknown	3	2	6	5	3	1	4	7	4	8	8	1	52	27	48	49	+25
Miscellaneous	12	11	15	11	4	10	6	9	6	6	6	6	102	163	160	178	—61

TABLE C.—*Interments in Detroit, by Months, in 1879, 1878, 1877, 1876, and 1875; Total Number of Interments for each of the Years 1872–9 inclusive; and Comparisons of the several years.*

YEARS.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Totals.	MORE THAN IN						Less than in
														1879	1878	1877	1876	1875	1874	1873
1879	165	178	180	172	148	132	267	237	195	154	164	200	2,192	.. .	283	87	....	....	....	314
1878	135	148	147	174	161	156	230	186	150	132	135	155	1,909	. ..	....	....	....	....	....	597
1877	185	152	178	171	176	148	249	237	153	148	150	158	2,105	....	196	....	....	....	....	401
1876	128	173	192	182	190	163	288	268	211	142	120	160	2,217	25	308	112	....	....	....	289
1875	189	168	178	170	177	165	319	244	220	176	146	169	2,321	129	412	216	104	....	....	185
1874	....	....	....	....	....	....	....	....	....	....	....	....	2,386	194	477	281	169	65	....	120
1873	....	....	....	....	....	....	....	....	....	....	....	....	2,506	314	597	401	289	185	120	....
1872	....	....	....	....	....	....	....	....	....	....	....	....	2,390	198	481	285	173	69	4	116
In 1879 more (+), or less (—), than in 1878	+30	+30	+33	—2	—13	—24	+37	+51	+45	+22	+29	+45	+283	....	....	....	....	....	....	....

Population, as per U. S. Census of 1880, 115,070; population of Hamtramck and Springwells, practically a part of Detroit, 12,109, making a total of 127,179.

TABLE D.—*The Number of Persons, by stated Periods of Age and at all Ages, Buried in Detroit during the Year, and in each Month of the Year 1879.*

AGES IN YEARS.	NUMBER BURIED, MONTHS 1879.												TOTALS BY YEARS.		
	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	1879.	1878.	1877.
All ages	165	178	180	172	148	132	267	237	195	154	164	200	2,192	1,909	2,105
Under 1	39	36	38	42	28	41	133	79	54	31	25	44	580	464	615
1 to 2	8	7	16	15	4	11	18	30	22	6	15	19	171	153	161
2 to 3	10	4	6	6	6	4	5	3	5	10	8	14	81	87	87
3 to 4	6	8	10	4	1	2	2	2	6	4	5	8	58	53	61
4 to 5	6	8	3	1	2	2	6	5	4	2	6	6	51	43	42
5 to 10	6	9	12	10	4	5	9	17	15	15	18	18	138	87	107
10 to 20	11	7	8	11	11	5	10	10	13	11	7	8	112	99	96
20 to 50	39	49	39	44	37	31	42	38	30	39	41	36	465	359	419
50 and upwards	33	35	35	27	35	21	25	37	31	19	25	32	355	340	341
Still-born	13	11	8	9	14	8	13	8	15	8	13	12	132	149	131
Unknown	4	4	5	3	6	2	4	8	0	9	1	3	49	75	45

TABLE E.—*Exhibiting the Nativity of those Interred in the Detroit Cemeteries during the Year, and in each Month of the Year 1879.*

NATIVITY.	NUMBER BURIED, MONTHS AND YEAR.												
	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	1879.
All nativities	165	178	180	172	148	132	267	237	195	154	164	200	2,192
Detroit	86	79	90	85	68	74	186	143	121	81	87	118	1,218
United States outside of Detroit	25	33	28	23	24	21	24	29	24	23	30	32	316
Canada	3	7	12	11	6	5	11	4	9	11	5	6	90
England	2	4	9	3	8	6	8	8	4	3	6	5	66
Ireland	18	18	9	12	18	6	6	7	9	8	8	12	131
Scotland	1	3	2	6	3	2	4	1	1	......	3	2	28
France	......	3	1	1	1	2	1	2	1	......	1	1	14
Germany	23	20	22	22	12	8	10	27	21	18	15	20	218
Switzerland	1	3	......	3	1	......	......	2	......	......	......	......	10
Holland	......	......	......	1	......	......	......	1	......	......	......	1	3
Belgium	......	......	......	......	2	......	2	......	......	......	......	......	4
Prussia	......	......	......	......	......	1	4	1	......	1	2	1	10
Austria	......	......	......	1	......	1	1	......	......	......	......	......	3
Italy	......	1	1	......	......	......	......	......	......	......	......	......	2
Various	......	3	1	1	1	3	3	......	2	3	1	2	20
Not given	2	3	5	3	4	2	5	12	3	6	6	......	51
Unknown	4	1	......	......	......	1	2	......	......	......	......	......	8

16.* None.

17. Small-pox, no well authenticated case. Cholera, none. The others will be best inferred from table B.

18. Cholera and small-pox, probably; one case of small-pox was reported on indifferent authority.

19. Yes; measles very extensively, and scarlet fever to a limited extent.

20. See table B. The deaths, however, do not give a fair idea of the cases of sickness from any given disease. Measles was unusually prevalent during December, and only 8 deaths were reported; while very few even heard of cerebro-spinal fever, and yet three deaths from it were reported for the same month. Refer also to my weekly reports.

21. During a portion of the Summer a disease prevailed to some extent among cattle in the western parts of the city, regarded by many as Texan cattle disease, or Spanish fever. It is supposed to have caused the death of about 400 cattle. The disease is regarded as contagious, and derived from Texan cattle brought here for beef. The symptoms usually observed are dullness, arched back, hollowness of the flanks, loss of appetite, high temperature, a quick and weak pulse, and varying condition of the bowels, sometimes loose, at others constipated. The breath is often very offensive, the milk becomes scant or absent, and as the disease advances, the cow becomes comatose. Paralysis is not unusual. The urine is scant and usually very highly colored. *Post-Mortem.*—The fourth stomach is congested and at times ulcerated, the bowels and kidneys are congested, and the bladder is often distended with bloody urine. There is congestion of the liver, and the spleen is often enlarged to three or four times its usual dimensions. The endocardium and peritoneum often contain spots of echymosis, and the brain is congested. The red corpuscles of the blood are shrivelled and the liquor sanguinis is rather deeper yellow color than normal. The flesh has a rather dark color and decomposes very rapidly.

22–27. I am not in a position to give satisfactory answers to these questions.

28. Through the kindness of Sergeant C. F. R. Wappenhaus, of the U. S. Signal Service, stationed at Detroit, I am enabled to present the subjoined meteorological table and observations:

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*The figures beginning paragraphs refer to questions in Circular 38, printed (in small type) on pages 224–241 of this Report. A summary of the replies is printed on pages 224–243.

General Meteorological Observations, Furnished by C. F. R. Wappenhaus, Sergt. U. S. Signal Service, Detroit, Michigan.

January: Temperature low at commencement of month. Number of rainy days and fluctuations of the barometer great.

February: Temperature low. Great fluctuations of barometer. Number of rainy days greatest since 1873.

March: Fluctuations of barometer great. Many rainy days, but little precipitation. Thunder-storm on 8th and 9th.

April: Temperature steadily increases. Few rainy days, and small amount of precipitation.

May: Mean barometric pressure and temperature the greatest for May since 1873. Fluctuations of barometer slight, and temperature stationary. A dry month. Percentage of humidity and amount of cloudiness small. Violent winds at end of month.

June: Highest mean temperature since 1873. Aurora Borealis on 17th.

July: Mean pressure low. Temperature highest since 1873. Several heavy rain and thunder storms.

August: Barometer and thermometer about normal. Precipitation small. Thunderstorms less than average.

September: Mean barometer highest; mean temperature lowest. Precipitation greatest since 1873. Range of barometer great. First frost on the 9th.

October: Mean barometer and thermometer highest since 1873. Barometer steady the first half of the month, after which it fluctuated greatly, and was extremely high at the end of the month. The temperature high and rainfall small.

November: Rapid fluctuations of barometer. High temperature. Frequent rains with greatest precipitation since 1873.

December: Mean barometer highest since 1874. Relative humidity and number of rainy days greatest since 1873. Amount of cloudiness great.

TABLE F.—*Exhibiting, for the City of Detroit, the extremes of Temperature and of Barometric Pressure; the Greatest Velocity and the Direction of the Wind; the Average Relative Humidity and the Average Absolute Humidity; the Number of Days on which Rain or Snow fell; the total Precipitation of Rain and Melted Snow, and the Interments in the City Cemeteries for the Year, and for each Month of the Year 1879.**

MONTHS AND YEAR 1879.	TEMPERATURE, DEGREES F.				BAROMETER, REDUCED TO FREEZING POINT.				WIND.		AV. HUM'DITY.		RAIN AND SNOW.		Interments.
	Highest.	Lowest.	Range.	Average.	Highest.	Lowest.	Range.	Average.	Maximum Velocity.	Direction.	Relative.	Absolute.	Number of Days.	Inches.	
January	44	—15	59	21.68	29.772	28.926	.846	29.362	22	s. w.	76	1.24	18	1.11	165
February	42	— 3	45	23.17	29.840	28.740	1.100	29.355	20	w.	71	1.15	20	2.64	178
March	67	14	53	34.53	29.863	28.961	.902	29.362	25	w.	71	1.98	18	1.68	180
April	76	16	60	45.38	29.749	28.739	1.010	29.292	20	s. w.	61	2.60	10	1.56	172
May	87	30	57	59.72	29.762	28.848	.914	29.366	36	s. w.	59	3.94	10	2.64	148
June	91	39	52	66.30	29.636	28.712	.924	29.297	24	s. w.	68	5.23	12	3.85	132
July	94	54	40	73.62	29.540	28.907	.633	29.281	25	s. w.	68	6.32	10	6.22	267
August	93	48	45	70.13	29.413	28.972	.541	29.295	19	s. w.	67	5.68	10	1.31	237
September	82	40	42	58.73	29.673	28.721	.952	29.395	20	s. w.	72	4.42	14	6.23	195
October	85	26	59	59.13	29.972	28.835	1.137	29.433	26	s. w.	73	4.71	10	0.83	154
November	69	12	57	39.20	29.828	28.867	.961	29.365	26	s. w.	77	2.59	19	4.71	164
December	59	— 2	61	29.45	29.793	28.750	1.043	29.375	24	s. w.	82	1.88	25	4.39	200
Year, 1879	94	—15	109	48.42	29.972	28.712	1.260	29.348	36	s. w.	70	3.48	176	37.17	2,192
Average	..	....	...	.....	......	.... ..	......	....	23.97	.....	70	3.48	14.7	3.10	182.67

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* The meteorological data for this table were kindly contributed by C. F. R. Wappenhaus, Sergt. Signal Corps, U. S. A.

29–36. Sufficient data are not at hand.

37. Nothing of especial interest.

38. This being a free country, it is not easy to control by acts of congress the actions of the citizens. The most feasible method, in all probability, is education. Much might be done by lectures or teaching in our public schools, by sanitary discussion and publication, etc., by means of which public sentiment might be stimulated into activity on these subjects, which are of vital importance to the individual and to the Nation.

Yours truly,
W. H. ROUSE, M. D., P. C.

439 Sixth Street, Detroit, Wayne County, June 21, 1880.

REPLIES BY J. M. SWIFT, M. D., OF NORTHVILLE, MICH.

1.* 900 to 1,000.

2. 14 (accurate). 2 of these infants 2 or 3 days old; 1 drowned in Detroit (drunk).

3. 1 mile square. Northville.

4. The same as average.

5. About the same.

6. None.

8. Typho-types and pulmonary acute.

9. No apparent reason.

10. None.

12. Acute pulmonary, typho-malarial, and diphtheria.

13. Immunity from dangerous forms of diseases.

17. Diphtheria, 3 or 4. Nothing worthy of note.

18. Small-pox, cholera, scarlet fever, typhoid fever, measles, whooping-cough, cerebro-spinal meningitis.

19. No.

20. Malarial influence mostly in warm months; a number of cases of consumption constantly, and a good deal of rheumatism all through year; cannot classify to advantage.

21. I know of none.

22. None.

23. First-rate.

24. I think not.

25. Yes.

26. None heard of.

27. Less.

28. Cannot.

29. No record.

32. Don't know, but nothing unusual.

33. From flowing springs to 40 feet; dry, gravelly soil.

34. Answered above as well as I can do it.

37. No cases.

38. Better attention to requirements of law by physicians and householders in reporting.

General health and best conditions of prosperity prevail through the year.

Very respectfully,
J. M. SWIFT.
Northville, Wayne County, Mich., May, 1880.

REPLIES BY E. P. CHRISTIAN, M. D., OF WYANDOTTE, MICH.

1.* Three thousand.

2. Probably about 30.

3. City of Wyandotte.

4. Greater. Increase at least 30 per cent.

5. Less. Diminished I should judge 20 per cent.

6. Scarlet fever in Spring and beginning of Summer; measles in Fall and Winter.

7. We had had no visitation of measles for several years, and there was an unusually large number predisposed to contract it.

8 and 10. I know of none.

12. Cholera infantum and infantile diarrhea.

13. Lessened prevalence.

14. None.

15. Scarlatina in Spring and Summer; measles in Fall and Winter.

16. None.

17. Scarlet fever very prevalent for several months; typhoid fever more than usually prevalent in Fall; measles more prevalent than ever before; whooping-cough very prevalent in Winter and Spring; diphtheria more than usually prevalent in Fall and Winter.

18. Small-pox, cholera, none to my knowledge, cerebro-spinal meningitis.

19. Yes; whooping-cough, scarlet fever, measles, and possibly diphtheria.

20. *January:* Influenza, scarlatina, bronchitis, intermittent fever, consumption, typho-enteric fever, tonsilitis, diarrhea.

February: Influenza, bronchitis, rheumatism, pneumonia, intermittent fever, consumption, neuralgia, diarrhea, (purpura, tonsilitis, cholera morbus, dysentery).†

March: Bronchitis, influenza, intermittent fever, neuralgia, tonsilitis, (rheumatism, pneumonia, consumption), mumps, puerperal fever.†

April: Intermittent fever, bronchitis, (rheumatism, consumption, mumps), (neuralgia, typho-malarial fever, diarrhea), (dysentery, scarlatina), (tonsilitis, chicken-pox.)†

May: Intermittent fever, scarlatina, consumption, remittent fever, pneumonia, (bronchitis, tonsilitis, mumps),† diarrhea.

June: Intermittent fever, scarlatina, consumption, bronchitis, (pneumonia, rheumatism, remittent fever, mumps, measles, tonsilitis),† diarrhea.

July: Intermittent fever, diarrhea, cholera morbus, remittent fever, (scarlatina, consumption), (cholera infantum, erysipelas, mumps, diphtheria), (rheumatism, tonsilitis, dysentery).†

August: Intermittent fever, remittent fever, bronchitis, cholera infantum, diarrhea, (pneumonia, diphtheria), (consumption, neuralgia, tonsilitis).†

September: Intermittent fever, remittent fever, consumption, typho-enteric fever, bronchitis, diarrhea, (rheumatism, tonsilitis), (typho-malarial fever, dysentery, neuralgia).†

October: Measles, (typho-enteric fever, rheumatism),† consumption, (diarrhea, bronchitis),† intermittent fever, tonsilitis, cholera morbus, neuralgia, membraneous croup, diphtheria.

November: Measles, diarrhea, rheumatism, inflammation of bowels, consumption, tonsilitis, typho-malarial fever, (intermittent fever, pneumonia), (typho-enteric fever, neuralgia, erysipelas).†

December: Measles, diphtheria, consumption, diarrhea, bronchitis, pneumonia, (neuralgia, rheumatism, intermittent fever, remittent fever, scarlatina).*

21. I know of none.

22. Potatoes very generally affected with rot.

23. Believed to have been good.

24. I think not.

25. I believe it was.

27. More so than usually.

29. I have no records of rain-fall, and hence can give no facts.

30. It was very dry in latter part of Summer and Fall.

31 and 32. No records.

33 and 34. Varies from 2 to 12 feet.

35. I think at no time.

36. At no time; wells dry as usual in Fall.

37. None.

E. P. CHRISTIAN, M. D.
Wyandotte, Wayne Co., Mich., March 17, 1880.

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* The figures beginning paragraphs refer to questions in Circular 38, printed (in small type) on pages 224-241 of this Report. A summary of the replies is printed on pages 224-243.

† Diseases included in the parentheses are regarded as having been equally prevalent.

A MODE OF VENTILATING
A ROOM
HEATED BY A COAL-STOVE.

By Rev. D. C. JACOKES, D. D.,

OF PONTIAC, MICHIGAN,

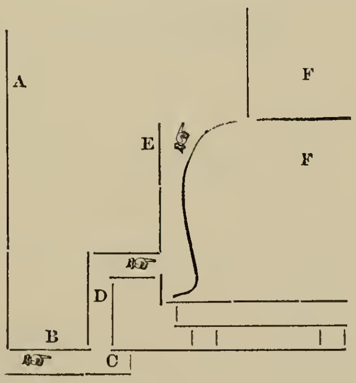
Member of the State Board of Health and its Committee on Buildings, Public and Private, including Ventilation, Heating, etc.

A MODE OF VENTILATING A ROOM HEATED BY A COAL-STOVE.

BY REV. D. C. JACOKES, D. D.

A very cheap and efficient plan for heating out-door air brought against the back of a *coal-stove* without disfiguring its general appearance. I am now using this method in my own dwelling and find it satisfactory. I have a conductor under the floor, through which out-door air is conveyed against the back of the stove, as in Figures 1 and 2.

FIG. 1.



A, wall of the room.
B, floor.
C, Box to convey the out-door air against the stove.
D, Stove-pipe, 6 in. diameter, fastened to the jacket E.
E, Sheet-iron jacket 16 inches wide and 18 or 20 inches high, between which and the stove the air is heated and passes into the room.
FF, stove.
The ☞ shows the direction of the air into the room.

FIG. 2.

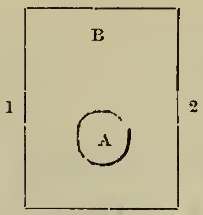
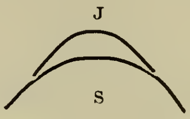


Fig. 2 shows the jacket of sheet-iron with the pipe fastened to it at A. The sides 1 and 2 are bent rounding so as to loosely fit the sides of the stove, thus:



J, jacket. S, stove.

The ventilation is obtained by a 4-inch stove-pipe opened at the bottom, taking the air from the floor, and connected with the chimney. By means of this pipe the heated chimney carries the *foul air* from the room out of doors.

REGULATIONS

FOR

EXAMINATIONS IN SANITARY SCIENCE,

BY THE

MICHIGAN STATE BOARD OF HEALTH.

ALSO A LIST OF BOOKS WHICH WILL BE FOUND VALUABLE TO CANDIDATES FOR EXAMINATION,

AND

A LIST OF QUESTIONS ASKED THE CANDIDATES AT THE EXAMINATION IN JULY, 1880.

REGULATIONS

FOR EXAMINATIONS IN SANITARY SCIENCE BY THE MICHIGAN STATE BOARD OF HEALTH.

of the Board will not be returned to them, but a second examination will be given to such applicants, without fee.

6. Examinations will be written.

7. The standard of requirements will be such, that, so far as relates to sanitary science, a person sustaining the examination will be considered properly qualified to act as health officer of any township, city, or village in Michigan.

8. The State Board of Health will give a Certificate to such persons as, on examination, are determined by a majority vote of the members of the Board, to be qualified in Sanitary Science, according to the standard established by the Board.

9. Candidates will be examined in the following subjects:—

I. Biology.—Including the reciprocal relations of the vegetable and animal kingdoms in process of growth, maturity, and decay,—the direct and indirect influences on human health.

II. The Nature, Causation, and Prevention of Diseases.—Including:
   a. *Vital Statistics,*—methods of ascertaining the death-rates and sickness rates from all causes, and from the different diseases, at different seasons of the year, among persons of each sex at the different ages in life;

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*Not on the Wednesday succeeding the second Tuesday in July, as heretofore published.

Paragraphs 4 and 5 in the regulations for examinations in Sanitary Science printed on page 269, have been amended to read as follows:—

4. Each and every candidate for examination shall, before appearing at the examination, pay to the Secretary of the Board an examination fee of one dollar.

5. The examination fee of those applicants who do not receive the certificate of the Board will be returned to them.

H. B. B., Sec. S. B. of H.

REGULATIONS

FOR EXAMINATIONS IN SANITARY SCIENCE BY THE MICHIGAN STATE BOARD OF HEALTH.

1. An examination in Sanitary Science will be held annually at Lansing, beginning upon the second Tuesday in July.*

2. All applicants for examination will be required to exhibit their diplomas from some reputable medical college, or give satisfactory evidence of the possession of a good practical knowledge of the English language, and of the sciences of Chemistry, Anatomy, Physiology, Pathology, and Toxicology.

3. All applicants for examination shall present their names to be enrolled by the Secretary of the Board previously to the session of the Board of Examiners.

4. Each and every candidate for examination shall pay to the Secretary of the Board an examination fee of ten dollars before appearing at the examination, except for second examination as specified in the next paragraph.

5. The examination fee of those applicants who do not receive the certificate of the Board will not be returned to them, but a second examination will be given to such applicants, without fee.

6. Examinations will be written.

7. The standard of requirements will be such, that, so far as relates to sanitary science, a person sustaining the examination will be considered properly qualified to act as health officer of any township, city, or village in Michigan.

8. The State Board of Health will give a Certificate to such persons as, on examination, are determined by a majority vote of the members of the Board, to be qualified in Sanitary Science, according to the standard established by the Board.

9. Candidates will be examined in the following subjects:—

I. Biology.—Including the reciprocal relations of the vegetable and animal kingdoms in process of growth, maturity, and decay,—the direct and indirect influences on human health.

II. The Nature, Causation, and Prevention of Diseases.—Including:
  a. *Vital Statistics,*—methods of ascertaining the death-rates and sickness rates from all causes, and from the different diseases, at different seasons of the year, among persons of each sex at the different ages in life;

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*Not on the Wednesday succeeding the second Tuesday in July, as heretofore published.

- b. *Meteorological Conditions Coincident with certain modes of Death or Sickness;*
- c. *Unsanitary conditions of surroundings,* their relations to the causation and prevention of diseases and deaths;
- d. *Occupations, Habits, and Physical and Mental Hygiene;*
- e. *Life-Histories of the Germs of Disease,* such, for instance, as small-pox; also of common bacteria; facts concerning the destruction of contagia and of bacteria by heat, etc.;
- f. *Incubation-Periods of Communicable Diseases;*
- *g.* *Management of Outbreaks of the different Diseases.*

III. THE PHYSICAL SCIENCES.—In their relations to the principles of Construction of Buildings, Ventilation, Warming, Drainage, Sewerage, Water-Supply, and to general questions in Sanitary Science, including:
- a. *Chemistry and Microscopy,* as regards the examination of Air, Water, and Food;
- b. *Meteorology,* as regards general knowledge of climatic conditions, the reading of instruments, and the correction of observations;
- c. *Topography and Geology,* as regards elevation above the ocean, and above surrounding country, the nature of the surface and of the underlying strata, the relations of such facts to the purity of the air and of the water-supply.

IV. SANITARY ENGINEERING, APPARATUS, AND APPLIANCES.—As regards Water-Supply, Sewerage, Disposal of Sewage, Excreta, and Garbage, House-Drainage, Drainage of Lands and of Building-sites, Ventilation, Heating, Cooking, Railroad and other modes of Travel, and Special Sources of Danger to Life and Health.

V. SANITARY INSPECTION.—Including:
- a. *The Principles of Plumbing, House-Drainage, and other Sanitary Arrangements about Dwellings;*
- b. *Seating, Lighting, Warming, Ventilating, and other Sanitary Arrangements of Schools and other Public Places;*
- c. *Investigation of the Origin and Spread of Outbreaks or Epidemics of Diseases;*
- d. *General Inspection of Cities, Villages, and Localities, with respect to Drainage, Sewerage, Ordinary and Other Nuisances.*

VI. SANITARY LAW.—National, State, and Local Health Laws and Ordinances, relating to the Isolation, Restriction, and Prevention of Cases of Communicable Diseases, Disinfection, Vaccination, Notices required from Physicians and Householders, Reports to Local Boards and to the State Board of Health, Laws respecting Vital Statistics, the Inspection and Care of Articles Dangerous to Life and Health, Inspection of Animals, and of Foods and Drinks, the Pollution of Streams, Ordinary Nuisances, Dangerous Trades, Slaughter-Houses, and Overflowed Lands.

LIST OF BOOKS WHICH WILL BE FOUND VALUABLE TO CANDIDATES FOR EXAMINATION IN SANITARY SCIENCE BY THE MICHIGAN STATE BOARD OF HEALTH.

The books are here classified the same as the topics published in the foregoing Regulations for the examinations. The necessity of reading all of the books is not urged.

I.—Introduction to the study of Biology. H. Alleyne Nicholson. Appleton & Co., New York, 75c.

Article on Biology, in Encyclopædia Britannica and in other Cyclopædias.

II.—*a.* Theory of Probabilities. M. A. Quetelet, translated by O. G. Downs. C. & E. Layton, London, England, $5.50.

Articles on Statistics and on Vital Statistics, in various Cyclopædias.

Essays and Papers on some Fallacies of Statistics. H. W. Rumsey. Smith, Elder, & Co., London, England. 12s.

Vital Statistics of Michigan. Annual Reports 1868–1876.

Article,—"Report on Methods of Collection of Vital Statistics," in Report of Michigan State Board of Health for 1876.

Article on "Weekly Reports of Diseases in Michigan." Annual Reports Michigan State Board of Health, 1878–1880.

b. Vital Statistics of Michigan for 1872 and subsequent years.

Annual Reports of the Michigan State Board of Health, 1878–1880. Articles on "Weekly Reports of Diseases," and "Principal Meteorological Conditions in Michigan."

c. Filth Diseases and their Prevention. John Simon, M. D. James Campbell, Boston, Mass. $1.

Disposal of Slop Water in Villages. C. B. Fox. J. & A. Churchill, London, England. 18d.

Healthy Houses. Fleeming Jenkin, F. R. S.; adapted to American conditions by George E. Waring, Jr. Harper's Half Hour Series. 25c.

House Drainage and Water Service. James C. Bayles. David Williams, New York. $3.

Wilson's Hand-book of Hygiene. Blakiston, Phila. $3.

Hart's Manual of Public Health. Smith, Elder, & Co., London, England. 12s. 6d.

d. Anstie on Stimulants and Narcotics. Blakiston, Philadelphia, Pa. $3.

Tables, etc., on Mortality by Occupations, in United States Census, and in Vital Statistics of Michigan, 1868–1876.

e. Disease Germs: Nature and Origin. L. S. Beale. Blakiston, Philadelphia. $5.

The Germ Theory of Disease. Maclagan. Macmillan & Co., London, England. $3.

*Lectures on the Theory and General Prevention and Control of Infectious Diseases, by James B. Russell, M. D. James Maclehose, Glasgow, Scotland.

Fermentation. Schützenberger. Appleton & Co., New York, $1.50.

Practical Biology. Huxley & Martin. Macmillan & Co., London. $1.50.

Air and its Relations to Life. W. N. Hartley. D. Appleton & Co., New York. $1.50.

Article on Origin and Propagation of Disease. John C. Dalton, M. D., read before the New York Academy of Medicine. Smithsonian Report, 1873.

f. *Lectures on the Theory and General Prevention and Control of Infectious Diseases. Jas. B. Russell, M. D. James Maclehose, Glasgow, Scotland.

g. Parkes' Hygiene, edited by De Chaumont. Blakiston, Philadelphia. $6.

Documents on "Restriction and Prevention of Scarlet Fever;" on "Restriction and Prevention of Diphtheria;" Circulars 34 and 35; issued by the Michigan State Board of Health, Lansing.

*Lectures on the Theory and General Prevention and Control of Infectious Diseases. Jas. B. Russell, M. D. James Maclehose, Glasgow, Scotland.

Annual Reports of the Michigan State Board of Health, 1876–1880.

III.—*a*. Attfield's General, Medical, and Pharmaceutical Chemistry. 8th Revised ed. Henry C. Lea's Son & Co., Phila. $2.50.

*Lectures on Air, Water Supply, Sewage Disposal, and Food. William Wallace. James Maclehose, Glasgow, Scotland.

Letheby on Food. Wm. Wood & Co., New York. $2.25.

Hassells' Food and its Adulterations. Longmans, Green, & Co., England.

Parkes' Hygiene, edited by De Chaumont. Phila. Blakiston. $6.

Wanklyn & Chapman's Water Analysis. Trübner, London, England. $2.50.

Sanitary Examinations of Water, Air, and Food. C. B. Fox, M. D. Blakiston, Phila. $4.

Frankland's Water Analysis for Sanitary Purposes. Blakiston, Philadelphia. $1.

b. Loomis on Meteorology. Harper, New York. $1.75.

(For reference.) Air and Rain. R. Angus Smith. Longmans, Green, & Co., London. 24s.

Annual Reports of Michigan State Board of Health: for 1874, article on "Meteorology of Central Michigan;" 1875, directions for taking meteorological observations, also an article on Ozone; 1878–1880, articles on "Principal Meteorological Conditions in Michigan."

Air and its Relations to Life. W. N. Hartley. D. Appleton & Co., New York. $1.50.

IV.—Sanitary Engineering. Baldwin Latham. Quarto. Geo. H. Frost, New York. $3.

Rawlinson's Suggestions. Geo. H. Frost, Tribune Building, New York. $1.50.

Sanitary Engineering. J. Bailey Denton. E. & F. Spon, London, England.

Parkes' Hygiene, edited by De Chaumont. Phila. Blakiston. $6.

House Drainage and Water Service, by James C. Bayles. David Williams, New York. $3.

The House and its Surroundings. D. Appleton & Co., New York. 40c.

Sanitary Houses. Two Lectures by James A. Russell, M. A., M. B., etc. Maclachlan and Stewart, Edinburgh. Simpkin, Marshall, & Co., London, England.

Sanitary work in Towns and Villages. Charles Slagg. Crosby, Lockwood, Co., London, England.

Sanitary work in Villages and Country Districts. George Wilson. J. & A. Churchill, London, Eng. Eighteen pence.

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* The lectures by James B. Russell, M. D. and William Wallace, are published in one volume by James Maclehose, Glasgow, Scotland; price, 1s. Hamilton, Adams, & Co , London, England.

*Lectures on Air, Water-Supply, Sewerage, and Food, by Wm. Wallace James Maclehose, Glasgow, Scotland.

Healthy Houses. Wm. Eassie. D. Appleton & Co., New York. $1.

V.—House Drainage and Water Service. James C. Bayles. David Williams, New York. $3.

Hand-book for Inspectors of Nuisances. Edward Smith, M. D. Knight & Co., London, England. 5s.

*Lectures on the Theory and General Prevention and Control of Infectious Diseases. Jas. B. Russell, M. D. James Maclehose, Glasgow, Scotland.

The Sewage Question,—with special reference to traps and pipes. A. Fergus, M. D., M. R. C. S. Porteus Brothers, Glasgow. Eighteen pence.

Annual Reports of the Michigan State Board of Health, 1873 to 1880.

Schedules for Sanitary Survey of a City. Am. Public Health Association. Published by U. S. National Board of Health, Washington, D. C.

Sanitary Inspection of Memphis, Tenn. Schedule and Report. National Board of Health, Washington, D. C.

VI.—Compiled Laws of Michigan, 1871.

Public Health Enactments in Session Laws of Michigan since 1871, particularly later ones, 1877, 1879, and 1881 (?), with index of laws amended, etc.

Public Health Laws of Michigan. Pamphlet, 1876. State Board of Health, Lansing. Postage, 3c.

In all cases where known, the price of the book, and the name of the American publisher, has been given.†

HENRY B. BAKER,
Secretary.

OFFICE OF THE STATE BOARD OF HEALTH,
LANSING, MICH., Nov. 24, 1880.

QUESTIONS ASKED BY MEMBERS OF THE MICHIGAN STATE BOARD OF HEALTH, AT THE SANITARY-SCIENCE EXAMINATION IN JULY, 1880.

QUESTIONS ASKED BY R. C. KEDZIE, M. D., COMMITTEE OF THE BOARD ON FOODS DRINKS, AND WATER-SUPPLY,—AND ON POISONS, EXPLOSIVES, CHEMICALS, ACCIDENTS, AND SPECIAL SOURCES OF DANGER TO LIFE AND HEALTH.

1. Necessary composition of food for animal life. How distinguish between wholesome and unwholesome food, (a) animal food; (b) vegetable food?
2. How determine the purity of milk? Is milk fresh from the cow "pure milk"?
3. Necessary condition of vegetables in regard to ripeness? Are unripe fruits and vegetables of necessity injurious to health?
4. What is *pure water* in a sanitary sense? How does the soil water become contaminated? Tests for contamination of water? What is *proof* of contamination? *Presumptive evidence?*

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* See foot-note on preceding page.

† This list of books is classified by subjects, the same as in the plan for the examination, pages 269-270.

5. Is the soil a *sanitary filter?* How secure a well from surface contamination.
6. How dispose of night-soil so as not to endanger the public health?
7. How much water should be allowed for each adult daily?
8. What is *pure air?* How measure the degree of impurity caused by respiration?
9. How disinfect a room infected by small-pox or scarlet-fever?
10. How disinfect the excretions of a person with an infectious disease so as to prevent the spread of the disease?

QUESTIONS ASKED BY HON. LEROY PARKER, COMMITTEE ON LEGISLATION IN THE INTERESTS OF PUBLIC HEALTH.

1. What bodies in this State are charged with the duty of executing the public health laws?
2. What are the necessary legal steps in order to force the abatement of an ordinary nuisance?
3. What are the duties of the health officer, speaking in a general way, as specified in the laws,—
   - (a.) In connection with his board?
   - (b.) Not in connection with his board, but as health officer.
4. What does the law of the State require, and under what penalty, of a householder within whose family occurs a case of any disease dangerous to the public health?
5. What does the law of this State require, and under what penalty, of a physician called to treat a case of any disease dangerous to the public health?
6. Whose duty, in law, is it to prosecute for the penalties referred to in questions 4 and 5,—
   - (a.) In townships?
   - (b.) In cities?
   - (c.) In villages?
7. Whose duty, in law, is it to notify the prosecuting officers of any violation of the law referred to in questions 4 and 5,—
   - (a.) In townships?
   - (b.) In cities?
   - (c.) In villages?
8. What are the statutory regulations relating to the collection and compilation of vital statistics? Give an outline of the plan under the State law.
9. What are the laws relating to the sale of poisons?
10. What qualifications does the law in Michigan require of those who practice medicine or surgery?

QUESTIONS ASKED BY REV. D. C. JACOKES, D. D., COMMITTEE ON BUILDINGS, PUBLIC AND PRIVATE, INCLUDING VENTILATION, HEATING, ETC.

1. What are the elements injurious to health in air vitiated by respiration, and why?
2. How much fresh air is it necessary to furnish, for each person in a room of given size, to keep the air pure?

3. What physiological effects are produced by increased or diminished atmospheric pressure, as on mountain, plain, or valley?
4. Describe the forces in a system of natural and artificial ventilation.
5. How may these forces be applied to the efficient ventilation of public buildings or dwelling-houses?

QUESTIONS ASKED BY DR. H. F. LYSTER, COMMITTEE ON SEWERAGE AND DRAINAGE AND ON CLIMATE, ETC., IN ITS RELATIONS TO HEALTH.

1. State the difference between ground-water and moisture of the soil.
2. State the effect of drainage upon the climate of a country.
3. State the effects of wooded country upon climate.
4. What forms of disease are favored by a surplus of moisture of the soil?
5. Describe the most desirable plan to dispose of the sewage of a village or town, when discharge into a river is inadmissible.
6. Give in detail the necessary specifications for connecting a dwelling with a lateral sewer, so as to avoid the dangers from sewer-gas.
7. Give an account of the water-supply and drainage of any town or village with which you are familiar, and note the good and defective points in the methods.
8. What is the annual rainfall in Michigan?
9. Does the quality of moist or dry climate depend upon the amount of annual precipitation?
10. How large a sewer would be required to convey the rainfall and sewage from 640 acres (in this latitude) covered as in large cities by dwellings, the inclination to be 1 in 240?

QUESTIONS ASKED BY JOHN H. KELLOGG, M. D., COMMITTEE ON DISPOSAL OF EXCRETA AND DECOMPOSING ORGANIC MATTER, AND ON OCCUPATIONS, RECREATIONS, AND HABITS IN THEIR RELATION TO THE PUBLIC HEALTH.

1. Name and describe some of the principal diseases and morbid conditions which are favored by or arise from excessive or deficient use of certain foods or food elements.
2. Describe the physical effects of alcohol as shown in cases of chronic alcoholism.
3. What diseases have been traced to excess in the use of tobacco and other narcotics?
4. Mention other habits injurious to health, and show their relation to disease.
5. Briefly describe the principal methods in use for the disposal of excreta, and express an opinion respecting the merits of each.
6. Describe the proper mode of treating the alvine discharges of a patient suffering with typhoid fever, dysentery, cholera morbus, or any similar disease.
7. Mention other kinds of decomposing matter which may be regarded as productive of disease.
8. What are the principal sources of injury to health in connection with occupations?
9. Name some of the most unhealthful occupations, giving reasons for their unhealthful character, and what methods, if any, may be adopted to render them healthful or less injurious.

10. Describe the conditions and habits of life most favorable to longevity and immunity from disease.

QUESTIONS ASKED BY HENRY B. BAKER, M. D., RELATIVE TO THE NATURE, CAUSATION, AND PREVENTION OF DISEASES, SO FAR AS RELATES TO VITAL STATISTICS AND RELATIONS OF CLIMATE TO DEATH-RATE.

1. What methods have been employed in Michigan for ascertaining the death-rate from different causes and at different ages?
2. Under the present law in Michigan, what is the chief reason why many of the deaths which occur are not returned by supervisors and assessors?
3. What disease causes most deaths in Michigan?
4. According to the vital statistics of Michigan, which of the two diseases, whooping-cough and small-pox, causes most deaths in this State?
5. What methods have been employed in Michigan for ascertaining what diseases cause most sickness?
6. So far as systematic evidence has been collected, what disease causes most sickness in Michigan?
7. What systematic efforts have been made in this State to learn the causes of diseases?
8. In order to prevent or avoid causes of sickness or death, what are some of the essentials?
9. According to evidence collected and published in Michigan, what are the principal meteorological conditions under which there are more than the average deaths from the following named diseases?—
    (a.) bronchitis?
    (b.) pneumonia?
10. According to evidence collected and published in Michigan, what are the principal meteorological conditions under which there are more than the average deaths from diarrhea?

OZONE IN NATURE.

ITS RELATIONS,

SOURCES, AND INFLUENCES.

By JOHN MULVANY, M. D.,

STAFF SURGEON, BRITISH NAVY.

OZONE IN NATURE.

ITS RELATIONS, SOURCES, AND INFLUENCES.

BY J. MULVANY, M. D., R. N. (ENGLAND).

Ozone, since its discovery by Schönbein, has been to the scientific world the subject of incessant study and observation; by medical men especially it has been regarded with the deepest interest, for experiment has shown artificially prepared ozone to be endowed with great energy of action and to be adapted by its physical attributes and chemical affinities to play a very important part in the chemico-vital processes of the system, and in the purification of the atmosphere. And as it was seen to stimulate the respiratory and circulatory organs, and when inhaled in excess, to irritate the mucous tract over which it passed, and moreover to be readily absorbable by the blood, in which it liberates oxygen, checks incipient putrefaction, and replaces it by restored coagulability, and to so elevate in the scale of oxidation the chemical formula of the products of retrograde metamorphosis, as to render them more facile of elimination, atmospheric ozone came to have ascribed to it the most varied offices and influences, prophylactic, sanitary, morbogenetic, etc. But the part it plays in the economy, and how far it ministers to health or promotes disease, should be determined by observation alone. And as it is rarely met with dissociated from meteoric and other subtle agencies which often are sufficiently powerful to modify the extent of its appreciability or to disturb the functional harmony of the system, a careful elimination of the effects of these one by one is obviously necessary for the differentiation of its action (*per se.*) For the acquisition of such an accumulation of data as this requires, the naval medical officer has peculiar facilities. In the observations from which the present report is epitomized are embraced the varied conditions of climate met with between the Doggerbank on the North, Madagascar and the Falkland Islands on the South, and from 96° Long. West to the same number of degrees East, and the modifications which ozone underwent from cold, heat, humidity, pressure, geographical position, configuration, soil, contiguity to a desert, a jungle, or a marsh, etc.; also the corresponding sanitary conditions on shore and afloat. As the investigation of its effects may be advantageously preluded by that of its relations, I will proceed to the consideration of these latter, commencing with temperature.

TEMPERATURE.—From experiments in the laboratory, when a high temperature is seen to break up the peculiar grouping of the molecules of oxygen which constitutes ozone, and restore them to their bulky and less active state, it has been supposed that a much heated condition of the atmosphere is inimical to ozonization, and hence probably it has come to be axiomatically formulated, that the curve of the ozone is in the inverse ratio to that of the temperature. Strictly speaking, this rule holds good where a high temperature with a minimum humidity obtains; but this is too seldom witnessed in nature to constitute a rule; so narrow is its applicability that it might rather be classed as an exception. For as the atmosphere becomes rarified by heat its capacity for taking up and holding water in a state of vapor is correspondingly exalted, and consequently a high temperature, except under peculiarities of locality to be hereafter alluded to, is always associated with a high humidity, and humidity is favorable to ozone. But regarding temperature alone, it will be seen from the following table that the temperature of the atmosphere as met with in nature bears *no* relation to its ozonic condition.

DATE.	PLACE.	TEMPERATURE IN SHADE.			Ozone, Mean.
		Minimum.	Maximum.	Medium.	
January, 1867	Lake Erie	14° below zero	32°	9°	2°.5
January, 1868	“ “	16 “ “	27	5.5	2.5
April, 1868	“ “	31 above “	52	41.5	3.0
March, 1870	Harlar Hospl., Heaths	26 “ “	61	41.5	2.0
August, 1872	Mozambique	70 “ “	90	80	1.3
May, 1872	East Africa	78 “ “	88	83	9.5
November, 1873	Trincomalee, Ceylon.	75 “ “	86	80.5	10.0
September, 1871	Persian Gulf	83 “ “	104	90	7.5

HUMIDITY.—When a high humidity accompanies a high temperature, the rule, with many exceptions, however, is that ozone is also high, and with a similar temperature and a low humidity ozone is scanty. This is illustrated by the following figures:—

DATE.	PLACE.	TEMPERATURE.		HUMIDITY.		Ozone.
		Minimum.	Maximum.	Per Cent of Saturation.	Vapor Tension.	
October, 1865	Santa Marta	78	85	77	0.723 in. Mercury.	5
August, 1871	Persian Gulf	87	114	79	1.223 “	6
July, 1873	Zanzibar	70	84	78	0.864 “	6
May, 1873	Muscat, Arabia	94	99	28	0.514 “	a trace.
September, 1872	Madagascar	72	97	51	0.570 “	2
January, 1877	Falkland Islands.	33	61	74		10

Than this relation of ozone to heat and humidity, nothing is more calculated to impress us with the benignity and prescience of the design which causes an augmentation of ozone, when for the maintenance of a pure atmosphere it is most required, that is, under the conditions of heat and humidity in which organic compounds are most unstable and putrefy with the greatest rapidity. The association of ozone with vapor in a high degree of tension, though not definite in its relation, is nevertheless so constant that whatever tends to augment the latter will have a similar effect on the former. This is well exemplified in the case of winds.

WINDS.—The hot, dry winds that sweep over the arid rocks of Beloochistan, or the thirsty sands of Arabia, rarely contain more than a mere trace of ozone when they arrive at the seaboard. In the Mozambique Channel, which the southeast trade winds reach after having their moisture wrung out of them by the high central plateau of Madagascar, ozone is very scanty indeed. At Trincomalee, during the southwest monsoons, which reach it after being filtered through the jungle, a great paucity of ozone is observed in the lower atmospheric strata. But on the contrary, wherever the breeze reaches after sweeping over a large tract of sea, ozone and humidity are usually abundant. Hence it appears to be through the nature of the surface over which they blow that winds influence the ozonic condition rather than by their force or direction.

Area.—The area over which winds pass, if homogeneous, tends greatly to augment or diminish ozone, water producing the former effect, land the latter, the difference between the west and east coasts of Mahé, in the Seychelle Islands, being one to two degrees less on the leeward side. In passing through the Bay of Bengal, January, 1874, with the northeast monsoon blowing, I got at the port of departure, Trincomalee, the maximum shade; at the Andaman Islands (Port Blair), it only amounted to 2; and at Rangoon, or the *embouchure* of the Irrawaddy, it barely reached 1.

Clouds are favorable to ozone. In the Indian Ocean, where, during monsoon weather, heavy murky piled clouds are often met with, the atmosphere is as a rule strongly ozonized; whereas, when the sky has been bright, blue, and cloudless for a week, it usually averages 1.5 to 2.

Atmospheric Pressure, humidity apart, does not appear to exercise any influence whatever over the ozonic condition; but taking 29.90 for the intra and 30.00 for the extra tropical standard, the greatest abundance coincides with readings below these.

Rain sensibly augments the ozonic condition; if there have not been a trace of colouring for several days a single shower is often observed to effect an immediate coloration. I once observed this under circumstances entirely unique. On the passage to Seychelles, in June, 1873, there was an abundance of ozone from a few days' sail off the Arab coast to within a short distance of the Equator. I did not observe the faintest trace of it during the 18th, 19th, and 20th, although the sky was cloudy, the air hot and humid, and the wind high and squally; but during the night of the 20th it rained heavily in showers, and next morning the test-slip was coloured to the utmost. As we had during the period of negation crossed the "Line," it struck me that the peculiarity of the negation might be owing to an antagonistic influence being exercised in the equatorial belt by the *horizontal magnetic force of the earth*, but subsequent experience showed this conjecture to be erroneous. It however led me to investigate the relative abundance of ozone in the north and south latitudes, but my data are not sufficiently copious to admit of deductions. During 250 days south of the Equator in the Eastern Hemisphere, the ozone averaged 3.5, and during 450 days north of it, 6.5. Since then I passed over two years south of the Equator, in the Falkland Islands, and never found the ozone under 10.

Squalls.—A squall without rain produces a very slight degree of coloration, but the increase resulting from a rain-squall is decided. A thin steady mizzle of a whole day's duration will not show more color than a strong rain-squall of two hours. This led me to believe that the *phosphoresence* of the tropical seas might be a source of ozone, and that the difference between the thin mizzle and the smart shower might be owing to the greater momentum of the latter penetrating the sub-surface waters and agitating the myriads of noctiluca which have their habitat there. and thus cause them to light up their tiny lamps and thereby generate ozone; but I failed to corroborate this by experiment, and subsequently I found reason to believe that rain simply acts as a vehicle, and that the difference in effect between the mizzle and the smart shower consists in the latter coming from a greater height,—but I will return to this presently.

ALTITUDE.—When, from any cause, the ozone of the lower atmospheric strata gets used up, that from the higher does not appear to diffuse readily into its place, and hence it occurred that I was often able to obtain a high degree of ozone at the masthead when the air on the upper deck gave hardly a trace. At Trincomalee, 1873, during the southwest monsoon, the greatest amount of ozone was always obtainable at the flag-staff, 175 feet high, next at the top of the mainmast of my ship, then on deck, and least in the village. The wind, before reaching the deck, got filtered through the jungle. The top of the mainmast reached a stratum only partially filtered, and the flag-staff towered above the tops of the tallest trees. The effects are seen in this tabular form:—

TIME OF EXPOSURE.	OZONE OBTAINED AT		
	The Flag-staff, 175 ft. high.	The Maintop, 120 ft. high.	On upper deck.
From 9:30 A. M. to 9:30 P. M., 6th Oct., 1873	9	7	2
From 9:30 P. M. 6th Oct., to 9:30 A. M., 7th Oct.	5	5	2
	14	12	4

EVAPORATION would seem to be indicated by the close relation which exists between humidity and ozone as a source of this latter; but although it contributes towards its *genesis de longue main,* it is not by the act of evaporation that ozone is produced; for when evaporation is greatly impeded or checked by the elastic force the atmospheric vapor has acquired, the ozone may be abundant, and *vice versa.*

GENESIS OF OZONE.

But though not a direct factor of ozone, evaporation appears essential to its formation, for, dormant in the vast quantities of vapor which ascend from the surface of the tropical seas at or beyond 85° F., it throws into the upper strata prodigious quantities of force in the condition of latent heat, which, as it becomes liberated by rarefaction and radiation, swells out the lower strata and approximates them to the upper; while at the same time, if one may judge by the strong electricity which accompanies the precipitation of vapor without rain on a clear Summer's evening, when a cloudless sky permits free radiation, the liberation of heat, the radiation and condensation in the upper regions similarly affect a liberation of electricity, and so augment the electric tension of the lower strata that the insulating medium (Quetelet) diminished in resisting power by the bulging upwards of the strata below it, is no longer able to keep the electricities apart, and in the act of uniting the paramagnetic oxygen, gets acted upon and condensed into ozone. If this supposition be correct the action of rain, etc., is easily understood. Rain would simply act the part of a vehicle and bring us ozone from the upper regions, and the difference between a smart shower and a drizzle would be occasioned by the former coming from a greater height, as attested by the greater velocity and momentum it acquires in falling in virtue of the accelerating force of attraction. It is probably owing to the absence of this vehicle that no appreciable increase of oxone is occasioned by the noiseless flash-lightning so common in Autumn and in the Tropics. It cannot be doubted that flash-lightning is identical in nature with the terrific corruscations, which, accompanied by thunder and rain, render the formation of ozone appreciable by the olfactories. But there is every reason to believe that the former occurs at a much higher altitude, at such a distance in fact, that its accompanying sound cannot reach us. By the vehicular function of the rain drops the favorable influence which clouds (rain spherules in a state of flotation) exert, is easily understood.

OZONE,—ITS RELATION TO DISEASE, AND ACTION ON THE SYSTEM.

Malignant Cholera.—Scanty ozone, or its total absence for a period, was supposed by Stiemer and others to be the *primum mobile* of malignant cholera, and Armand Isbert looked for its efficient cause in a similar condition of ozone combined with exaltation of temperature, great humidity, and stagnation of the atmosphere. During the cholera epidemic which swept the East in 1871, and paid a visit to H. M. S. "Magpie," the ozonic condition presented no peculiarity either in point of paucity or abundance; and it is not a little remarkable that when the heat reached its maximum and brought in its train great humidity and arid stagnation, the cholera entirely ceased, but reappeared as soon as the great heats were over, and the morning and evening atmospheric circulation became again brisk. The following table will show the leading features of the two cholera periods and the intervening healthy interval in the Persian Gulf in 1871.

First Cholera Period, July 1 to July 20.	Healthy Interval, July 20 to August 28.	Second Cholera Period, August 28 to October 1.
Wind, N. Force, 2 to 6	No winds	Variable, 2 to 6.
Temperature, 75° to 93°	89° to 104°	80° to 94°. Under double awnings.
Vapor tension, 0.654 in.	1.106 in.	1.015 in.
Saturation, 50	84	70.
Ozone, 4 to 9	2 to 6	2 to 6.

In both these periods it would be impossible to suppose that ozone was in any way connected with the origin or prevalence of the disease, and it is quite clear, and was recognised by every one on board, that its temporary cessation was occasioned by the intense heat.

Consumption has been ascribed by some to a deficiency, by others to the opposite extreme, of ozone. Amongst those who held the latter was its illustriour discoverer. The disease is met with under circumstances unfavorable to the presence of ozone, viz., where overcrowding occurs, and the ozone not only gets used up but the atmosphere gets vitiated by exhalations from the skin and lungs, and it is rather to this latter pollution that the disease must be ascribed than to ozonic deficiency. In Nassau, N. Providence, the sanitarium of the West Indies, the disease commits the most fearful ravages amongst the negroes, who sleep in close, small windowless huts, stretched out *ventre à terre*, but spares the whites, who sleep in large, well ventilated apartments. In Seychelles it is also met with amongst the blacks, who resemble their brethren of the West Indies in their domestic arrangements. Amongst the Sakalavas, Arabs, and negroes of

Madagascar, where the ozone is hardly ever above 2 or 4, I never met a single case; but their houses are simply constructed of reeds, or if of mud, the gables do not reach to the roof, so that free ventilation always obtains. In the Indian Islands, where, during certain months, an excess of ozone is the rule, and in the Falkland Islands, where an excess is constant, consumption is hardly ever met with,—so that I do not believe ozone tends, either by excess or the opposite, to promote the disease. But a cure being once established, I believe an ozonized atmosphere to be more suitable than one where there is but little.

SLOUGHING ULCER is common in the Mozambique, but so it also is in Seychelles, and there it was found to depend on the presence of a parasite intermediate in shape between the chigoe [jigger] and the cimex lectularius.

EXCESS OF OZONE.

The diseases I have met with most frequently in association with excess of ozone are simple fevers, functional heart disorders, and dysentery, but I have never found reason to think it had any causal agency in their production.

INFLUENCE ON THE PROCREATIVE FUNCTIONS.

The only influence I have been able to obtain satisfactory indications of ozone exercising on the human system, is, that which it appears to exercise on the procreative functions; whether it exalts the vitality of the Graffian vesicle, stimulates the inherent developmental force of the seminal corpuscles, increases the activity of the generative organs in the male and female equally, I know not; but it certainly appears to increase the chances of fecundation, for I have found that births are few where ozone is scanty, and numerous where abundant. In a Sakalava or negro village, on the west coast of Madagascar, the most striking features are the scarcity of children, and the great number of old men and women. The negroes have lost that special aptitude for augmenting the census that characterises them in the Antilles, and in even the neighboring islands, Johanna, Seychelles, and Zanzibar. But the Malagash negroes breath a scantily ozonized air. On the north side of Cuba and Jamaica large families are the rule. On the east coast of Central America multiple births are not uncommon. *La calle de los siele niños,* "the street of the 7 children," perpetuates in its name the fecundity of a Santa Martana. In July and August, 1867, babies came in platoons along the shores of Lake Erie as a result of the high ozonic condition of the Indian Summer months of the year before. At Trincomalee, in Ceylon, the most positive evidence of this peculiar influence is obtainable; the village is low, but little above the sea level, is open to the sea on the northeast, and has the jungle to the southwest. From May to September the southwest monsoon blows over the island, and in passing through the jungle gets robbed of its ozone. From October to April the northeast monsoon blows over the Bay of Bengal and arrives at the village laden with ozone. During April the winds veer from northwest to southwest, and ozone is in fair proportion. Here is a suitable field for testing its influence. For this purpose I overhauled the baptismal registers for two years kept by the Roman Catholic priests, because their religion requires a child to be baptized as soon after birth as possible. Then I had access to the public register. Then I examined the meteorological records kept at the flag-staff, and comparing the colour slips showing the ozone on board, found the proportion of ozone in the village to that of the flag-staff, with the result that during the southwest monsoon, viz., from May to September, the ozone in the village was 2½; from Oct. to April, 8. And the corresponding conceptions were 57 and 100, viz., ozone 2.5, conceptions 57; ozone 8, conceptions 100.

RELATIVE TO

ATMOSPHERIC OZONE

AND THE

BEST METHODS FOR ITS OBSERVATION.

—BY—

A. W. NICHOLSON, M. D.,

—OF—

OTISVILLE, MICHIGAN.

ATMOSPHERIC OZONE,

AND THE BEST METHODS FOR ITS OBSERVATION.

BY A. W. NICHOLSON, M. D.

Such experiments as I have conducted have principally been made with Schönbein's test of iodide of potassium and starch, that being considered the most reliable test for the presence of ozone.

While the many observations taken by those interested in studying the relation of ozone to prevailing disease are of great value, it cannot be denied that errors creep in and render many *single* observations of little value.

Often an apparent decrease in atmospheric ozone will exist when an increase will be the actual condition. There may be an error by excess of moisture, by an exposure of the test-paper to too great velocity of the wind, etc.

It has been stated that ozone is absent in dwellings. While this statement is not incompatible with any theory concerning the relations of ozone to conditions of health or disease, it is not altogether truthful; for many conditions obtain in the in-door atmosphere that occasion error in the result of a given observation, and, notwithstanding the presence of these conditions, the presence of ozone in dwellings has often been discerned by the writer and by others.

It is true that the results of experiments concerning the amount of ozone in the air above swamps are often negative, yet here there is, without doubt, a source of error in an excess of moisture.

The principal experiments conducted by myself have been to determine the presence of ozone in dwellings, and the probable influences affecting such tests; to determine the relative amount of ozone in pine forests, compared with observations taken in the open country; to ascertain the relative amount of the same element by experiments conducted in the smoky atmosphere in proximity to a large number of "pits" for the manufacture of charcoal; to estimate the amount of ozone existing over swamps; and to compare the amount of the same by the exposure of tests at the differing elevations of four feet and fourteen feet from the ground. Experiments were also made with regard to the influence of decomposing animal excreta upon the test, compared with tests made one hundred feet distant from the first, or from any such element of contamination. Observations also were made to determine the effect of excess of humidity upon the test: and, lastly, to determine the difference in the quantity of active oxygen present in the atmosphere of a malarious region with that of an atmosphere in a non-malarious region, the same test being employed in both localities, and the observations being taken at the same hours of the day.

Many of these observations may be but repetitions of those made by other observers, but the information already obtained is only sufficient to act as an incentive to other investigators to continue their labors in this direction. If there is no veritable connection between the varying proportions of ozone or active oxygen and health or disease, inquiry should be continued until proof of this fact is substantiated. If there is a relation, though slight, the solution of the problem is worthy of the most untiring study.

In experimenting to determine the proportion in the atmosphere of oxidizing elements bearing a relation to health and disease, it does not seem necessary to employ a test that will verify only the existence of a single factor like that of ozone. Oxygen in a state of activity, whether generated by electrical, or other influences, from oxygen in a nascent condition, or from products that easily liberate oxygen in a state of activity, like the essential oils, peroxide of hydrogen, or resinous compounds, is the desired factor to be searched after by the sanitarian and etiologist. If the test detects compounds that in themselves produce a coloration of the test-paper, it appears equivalent to a determination of an equal amount of active oxygen.

Is ozone to be discovered as existing in dwellings?

Max Von Pettenkofer, of Munich, in an article in the Contemporary Review, entitled, "The Hygienic Influence of Plants," makes the following assertion in regard to the relation of ozone to the appearance or disappearance of disease: "But one fact which was observed from the first, shows that it cannot be so; for the presence of ozone can never be detected in our dwellings, not even in the cleanest and best ventilated. Now, as it is a fact that we spend the greater part of our lives in our houses, and are better than if we lived in the open air, the hygienic value of ozone does not seem so very great."

Such a declaration, proceeding from such an influential origin, would, if erroneous, lead to many false deductions. That it is incorrect, the succeeding exhibit of the results of observations taken by myself, appears to prove. The observations were made with Schönbein's test, moistened before exposure. The apartment where the experiments were made was well constructed, and a free circulation from the external air permitted, when there was the greatest coloration, allowing motion to the air and access of moisture. Where least coloration occurred every avenue to the external air was closed as much as possible.

EXHIBIT A.

DATE.	INTERNAL OBSERVATION.		EXTERNAL OBSERVATION.		REMARKS.
1880.	Night.	Day.	Night.	Day.	
June 10	-------	1	-------	3.5	All numbers correspond to scale of 10 degrees of coloration.
" 11	0	1	2	3	
" 12	1	2	2.5	3	
" 13	2	2.5	3.5	3	Strong wind.
" 14	1	1	3.5	3	
Average	1	1.5	2.9	3.1	

During the Winter, in a north room of my own dwelling, where an effort was made to exclude the factor of ventilation, a coloration of three degrees was obtained. The temperature of the room was fifteen degrees Fahr., and a strong wind was blowing from the north. Externally a coloration of nine degrees was obtained. At the same time, in another north room of the same house, where the temperature amounted to seventy degrees Fahr., a distinct trace was discernable. At another time, when the external air was quiet, there was obtained one degree of coloration in the first room, where the temperature was forty-five degrees Fahr., and in the second room no coloration, with a temperature of seventy degrees Fahr. These results would suggest that a certain amount of motion of the air exceeding that usually existing in dwellings, would be auxiliary to conditions producing a manifestation of the presence of ozone therein. That the excess of moisture *externally* over that in the *interior* of dwellings is not a factor to be considered, seems proved by experiments made by the writer in regard to effects of moisture on the test as existing in dwellings. It was found that in rooms ventilated, when the external air was not disturbed by the influence of storms, the amount of moisture (absolute humidity) internally was equal to the amount of moisture externally, and that there was sometimes an excess of moisture in the interior of a dwelling over that exterior, when the amount of ozone was slight or entirely absent in the dwelling.

It is probable that sunshine is a condition aiding the production of ozone in dwellings, as more ozone was present during the day than night.

Prof. R. C. Kedzie, in his article on "Ozone," which may be found in the Annual Report of the Secretary of the State Board of Health of Michigan for 1875, says: "Ozone is doubtless formed in every sunlit room, and by its formation and destruction a vast amount of *materies morbi* may be destroyed, and it is no satisfactory proof that it is of no worth or influence because no residual ozone remains to act upon our test-paper."

Just what the influence upon the test is that is produced by the presence of carbon compounds, it is difficult to express. That its presence may modify the results of an experiment to ascertain the amount of ozone present is possible. To determine if the presence of pure carbonic acid would decolorize a slip of test-paper, already colored by exposure, I subjected a moistened slip to an atmosphere of carbonic acid by collecting the same over a pneumatic trough. On the gas being washed by passage through water the color upon the slip remained unaltered. On subjecting it to the influence of the gas as it escaped unwashed from the generator, a decolorization immediately occurred. This was found to be due to the presence of sulphurous acid.

Smoke is an element that will decolorize a slip of the test-paper already charged with liberated iodine. It is probable that the volume of smoke that usually, though imperceptibly, escapes from the stove, contains some property, perhaps that of sulphurous acid, that causes a change in the iodine as rapidly as it is liberated, resulting in the formation of a colorless iodate. To demonstrate the effect of gases, or smoke, generated by the stove, I introduced a glass tube through an opening of the stove into the midst of burning coals, and into the outer extremity of the tube I placed some of the test-paper already colored by the action of ozone. The result was a marked loss of the color on the paper. That this was not due to the action of increased temperature was proved by exposing a similar paper to the action of the same temperature at other points.

Although it is apparent that the amount of ozone in dwellings is actually less than that in the external air, it is also true that there exist agents that at present prevent an accurate estimate from being obtained by Schönbein's test. That active oxygen bears to organic life—to physiological or pathological conditions—some essential relation, is a proposition yet open for discussion. To declare that its presence in dwellings is not proved is apparently an error. Even were it absent from dwellings that circumstance could not prove its non-relation to health or disease. Without endeavoring to court discussion upon this important subject, it seems plausible to the writer that no oxygen enters the blood in any other state than as active oxygen. It may be that the large area of the alkaline pulmonary secreting surface, subject to the results of continuous evaporation, is in a condition to effect a generation of sufficient active oxygen to supply the blood with that which it requires. The excess in the external atmosphere may be of importance to the individual when a decrease in the external temperature intuitively directs him to take less deep inspirations than the warmer and drier atmosphere of the dwelling demanded, thus rendeing the labor of the lungs less in supplying a given quantity of active oxygen to the blood. If it should be objected that the ratio of active oxygen necessary to sustain the physiological requirements of the blood is not constant, I would inquire if the ratios of most meteorological conditions are constant.

During portions of the months of March and April, 1878, while the ground was frozen, and part of the time overspread with snow, I secured a record of observations of the amount of ozone in a small pine forest about eight miles distant from my usual point of observation. The following exhibit represents the comparative amount existing at both places at the same time:—

EXHIBIT B.

DATE, 1878.	PINE FOREST.		OPEN COUNTRY.		DATE, 1878.	PINE FOREST.		OPEN COUNTRY.	
	Night.	Day.	Night.	Day.		Night.	Day.	Night.	Day.
March 4	6	5	8	4	Mar. 20	4	5	5	3
" 5	6	5	6	4	" 21	5	4	4	4
" 6	6	5	4	5	" 22	5	4	8	5
" 7	6	5	10	8	" 23	5	5	5	5
" 8	4	4	8	7	" 24	4	6	4	6
" 9	5	4	5	4	" 25	5	5	5	5
" 10	5	5	8	4	" 26	5	5	5	5
" 11	5	5	9	8	" 27	4	4	8	5
" 12	5	5	10	9	" 28	4	4	9	8
" 13	6	5	10	9	" 29	4	5	8	4
" 14	4	5	8	9	" 30	5	5	4	4
" 15*	2	4	1	4	" 31	5	5	9	8
" 16	5	5	10	8	April 1	5	5	9	7
" 17	5	5	9	10	" 2	5	4	5	3
" 18	4	5	9	8	" 3	4	3	4	3
" 19	6	5	8	7	Average	4.80	4.70	6.93	5.90

* Frost on night ozonoscope.

NOTE.—Night observations from 9 P. M. to 7 A. M.; day observations from 7 A. M. to 2 P. M.

It is generally believed that ozone, or that product nearly identical in its nature, the peroxide of hydrogen, exists in excess amidst coniferous vegetation over that found in most other regions, but the above exhibit presents results contrary to that which might be expected to exist. This difference is, no doubt, in a great degree due to the time of year being when there was the least development of vegetable products, to the more confined circulation of the air, and perhaps to excess of humidity. The ground was low.

During the preceding Summer, in the months of August and September, I secured the results of observations taken in the same pine forest, as represented in the following exhibit.

EXHIBIT C.

DATE, 1877.	PINE FOREST.		OPEN COUNTRY.		DATE, 1877.	PINE FOREST.		OPEN COUNTRY.	
	Night.	Day.	Night.	Day.		Night.	Day.	Night.	Day.
Aug. 26	3	4	1	4	Sept. 11	0	1	1	2
" 27	4	3	3	4	" 12	2	3	3	3
" 28	0	1	0	1	" 13	0	3	0	2
" 29	3	4	2	3	" 14	0	4	0	3
" 30	1	3	1	2	" 15	3	3	2	3
" 31	4	2	3	4	" 16	2	3	2	3
Sept. 1	4	4	4	3	" 17	4	4	3	4
" 2	1	4	3	3	" 18	3	4	1	4
" 3	3	3	3	4	" 19	3	4	2	4
" 4	3	4	3	4	" 20	1	3	1	2
" 5	2	3	2	3	" 21	1	4	1	3
" 6	3	3	3	4	" 22	2	3	0	3
" 7	1	4	1	4	" 23	3	4	1	3
" 8	1	3	1	3	" 24	3	2	3	3
" 9	1	4	1	4	" 25	1	2	2	3
" 10	3	1	3	3	Average	2.09	3.13	1.80	3.16

In the above exhibit we find a considerable difference in the two averages of night ozone, that found in the pine forest being in excess. The variation in the amount of ozone ascertainable during the day was slight. Were a sanitarium to be established in the vicinity of a pine forest for the sake of the salubrity of its immediate atmosphere it would appear expedient to consider other elements liable to affect the health, than ozone alone.

EXHIBIT D.

DATE, 1877.	COAL PITS.		OPEN COUNTRY.		DATE. 1877.	COAL PITS.		OPEN COUNTRY.	
	Night.	Day.	Night.	Day.		Night.	Day.	Night.	Day.
Aug. 1	2	3	2	4	Aug. 12	2	3	3	4
" 2	1	2	1	2	" 13	2	3	3	4
" 3	1	3	1	4	" 14	1	3	2	4
" 4	1	2	0	3	" 15	1	4	3	4
" 5	1	3	1	4	" 16	1	3	1	2
" 6	2	4	4	4	" 17	2	3	1	3
" 7	1	3	2	3	" 18	1	3	0	4
" 8	1	4	3	3	" 19	1	2	1	4
" 9	1	4	2	4	" 20	2	2	1	4
" 10	2	3	3	4	" 21	1	2	2	4
" 11	1	4	0	3	Average	1.33	3.00	1.71	3.57

Exhibit D records the results of observations taken in the borders of a pine forest, but in close proximity to coal-pits, as compared with those taken at a distance and free from any known cause of local disturbance to the test. The heavy night atmosphere at the pits was surcharged with smoke that during the day-time was less concentrated. The results of the observations at this point were, at night, almost negative although recorded as one degree of coloration whenever a trace was discernible. The negative results obtained here are accounted for by the presence of the decolorizing carbonaceous elements of the atmosphere associated with the element of excess of humidity. It does not seem unreasonable to conclude that the quantity of ozone present in an atmosphere subjected to the above mentioned influences, cannot be determined by the employment of Schönbein's test.

During the construction of these coal-pits, in the year preceding these experiments, the amount of sickness at, and near to, them was very great. In a population amounting to 150, nearly one-fourth were simultaneously afflicted with fevers of a periodic type. Clay and porous soils were being overturned for the first time and large belts of timber were being felled, opening avenues to swamps and ponds. The greatest prevalence of sickness was during the burning of some of the pits first constructed. The season during which the observations were taken was marked by a diminution in the number of cases of fever.

Another month's observations taken at the same place gave results almost identical to those above given.

The following exhibit represents the comparative amount of ozone existing over a swamp two miles from the point where the observations were taken with which they are compared. They were also taken simultaneously with those observations relating to the quantity of ozone existing in a pine forest.

EXHIBIT E.

DATE, 1877.	OVER SWAMP.		POINT FREE FROM SUCH INFLUENCES.		DATE, 1877.	OVER SWAMP.		POINT FREE FROM SUCH INFLUENCES.	
	Night.	Day.	Night.	Day.		Night.	Day.	Night.	Day.
Aug. 26......	1	2	1	4	Sept. 10......	0	0	3	3
" 27......	1	2	3	4	" 11......	0	1	1	2
" 28......	1	1	0	1	" 12......	0	3	3	3
" 29......	1	3	2	3	" 13......	0	1	0	2
" 30......	1	1	1	2	" 14......	0	2	0	3
" 31......	4	5	3	4	" 15......	2	2	2	3
Sept. 1......	0	1	4	3	" 16......	1	2	2	3
" 2......	0	0	3	3	" 17......	0	3	3	4
" 3......	0	1	3	4	" 18......	0	1	1	4
" 4......	0	3	3	4	" 19......	--------	--------	2	4
" 5......	0	1	2	3	" 20......	0	5	1	2
" 6......	0	1	3	4	" 21......	0	4	1	3
" 7......	0	1	1	4	" 22......	0	0	0	3
" 8......	0	3	1	3					
" 9......	0	5	1	4	Average...	0.44	1.92	1.78	3.17

In the above exhibit a great difference is seen to exist between the averages of the two points of observation.

Whether this difference is due to the emission of gases destructive to a large portion of the atmospheric ozone naturally present, or whether the same interferes with a deposition of liberated iodine, or whether the apparent absence is due to an excess of moisture sufficient to decolorize the paper, are inquiries that can only be determined by experimentation. The excess of humidity naturally present at such a point appears to offer some explanation.

The experiments over the swamp were made by suspending slips of test-paper about three feet above the soil. They were exposed to a free circulation of the air but protected from the sunlight. During the time these observations were being taken the several families residing near this swamp suffered more or less from frequent attacks of periodic fever.

With a view to ascertain the comparative results of observations for the presence of ozone as it existed at two differing points of elevation, fifty-four observations were conducted at the elevations of four and fourteen feet from the ground.

The following exhibit contains the results of these observations.

EXHIBIT F.

	Higher Elevation.		Lower Elevation.		Remarks.
	Night.	Day.	Night.	Day.	
	4	9	7	9	Rain all day.
	8	8	9	7	Rain all day.
	7	7	8	8	Rain all day.
	9	5	8	5	Rain in night.
	4	4	8	6	Rain in morning.
	7	5	8	5	Rain all day.
	4	5	5	6	Fair.
	5	5	6	5	Fair.
	4	3.5	4	3.5	Fair.
	4	3.5	3	3.5	Rain in night, paper lost color.
	1	4	2	4	Fair.
	2	3	2	3	Fair.
	3.5	--------	3.5	--------	Fair.
	1	4	3.5	4	Fair.
Average..	4.53	5.07	5.50	5.30	

These observations do not demonstrate that actually a greater quantity of ozone was present in the lower stratum of the air than in the upper. The variation of the degree of moisture at the two points may lead to an explanation; yet, the excess of ozone at the lower plane seemed to correspond with presence of aqueous precipitation and a consequent pulverization of the raindrops. This might have led to the generation of ozone by increase of electrical influences, as spoken of by Fox in his work on "Ozone."

At the suggestion of Dr. Baker, Secretary of our State Board of Health, who has made many observations upon the influences of ozone, and to whom I am indebted for much kind assistance, I directed my attention to the relative quantity of ozone existing near decomposing animal excreta as compared with that found one hundred feet distant from any such contaminating influence.

EXHIBIT G.

DATE. 1879.	Impure Air.		Pure Air.	
	Night.	Day.	Night.	Day.
June 9	2.5	3.5	4.5	3.5
" 10	2	2.5	3.5	3.5
" 11	1	3	2	3
" 12	2	2.5	2.5	3
" 13	3	--------	3.5	
" 14	3	3	3.5	3
Average	2.3	2.9	3.3	3.2

Both ozonoscopes were suspended at a distance of six feet from the ground, and both were subjected to the influence of the same degree of atmospheric humidity. It is therefore probable that the variation in the degree of coloration was due to the exposure of one ozonoscope to the influences of rapidly oxidizing effete material.

In considering the influences existing that might have occasioned an error in the results of the observations recorded in the foregoing exhibits, none is more apparent than that of excess of moisture. Some atmospheric conditions associated with twenty observations where there was a total absence of coloration are shown in the succeeding exhibit.

EXHIBIT II.

NUMBER OF CASE.	Lowest Temperature.	Velocity of Wind,—Miles per Hour.	Relative Humidity.	REMARKS.
1	44	2	75	Few clouds.
2	37	2	96.6	Cloudy. Frost on test-paper.
3	34	2	96.6	Frost.
4	32	2	96.6	Slightly cloudy.
5	32	2	96.6	Slightly cloudy.
6	32	2	96.6	Slightly cloudy.
7	32	2	96.6	Slightly cloudy.
8	25	2	100	Slightly cloudy.
9	41	2	96.6	Slightly cloudy.
10	45	12	100	75 per cent of clouds. Heavy dew.
11	44	2	100	Heavy dew.
12	57	2	100	Smoky,—75 per cent of clouds.
13	44	2	85	Heavy dew.
14	44	2	100	Heavy dew. No clouds.
15	44	2	100	Heavy dew.
16	59	2	100	Heavy fog,—50 per cent clouds.
17	46	2	96.6	Heavy fog,—75 per cent clouds.
18	49	2	96.6	Heavy dew. No clouds.
19	25	2	100	Frost. No clouds.
20	57	2	96.6	90 per cent clouds.

The above cases represent nearly all those of complete obliteration of color occurring during a period of three years. *These all occurred during the night observation.* With each case there was nearly, or quite, a complete saturation of the atmosphere with moisture.

In one hundred and forty-three observations taken by myself to determine the relative value of Schönbein's test when exposed to the air dry, and when exposed after having been previously moistened, I discovered an excess of coloration in the dry slip over that of the wet slip forty times, the largest excess being five degrees of coloration. During these forty instances the sky was covered with one hundred per cent of clouds. In only six instances in the whole number of observations was the wet slip colored in excess of the dry when there was one hundred per cent of clouds. When there was less than seventy-five per cent of clouds the *moistened* slip was more greatly colored than the dry. While I at one time thought it possible that some electrical phenomena might be a cause of the ozonoscopic conditions just mentioned, I am now disposed to believe the cause to bear relation more to hygrometric states influenced by the varying per cent of clouds. A *dry* slip is exposed to the influences of these conditions and a gradual deposition of the moisture upon the same, aids rather than retards the coloration. But when a *moistened* slip is exposed to the influences of these conditions of the atmosphere it is liable to become blanched as fast as the iodine is deposited. Cornelius B. Fox says: "If the iodide of starch be so slightly soluble in water, how does it happen that these tests often and rapidly become when they are wet, completely blanched? If a deeply tinted Negretti's test be cut into small portions and placed in a little distilled water, some difficulty will be experienced in rendering the fragments colorless. Many hours, and perhaps a day or two will elapse before all color is removed from them. If, on the other hand, a colored Negretti's test be kept in a moist condition with distilled water, conducted to it by a fine thread of lamp-wick or darning-cotton, the color will rapidly disappear. In the latter experiment the iodide of starch becomes vaporized from the test."

It is thus proved that in more than one-fourth of the cases where observations are taken with Schönbein's test, providing the same proportion of days all cloudy existed as above illustrated, the dry slip will exhibit the greatest coloration, and in the remaining cases the deepest tint would be exhibited by means of the wet slip.

Through the kindness of a friend residing in Litchfield county, of the State of Connecticut, I was enabled to secure results of ozonometric observations among its non-malarious hills, during the summer of the year 1878. The record of these observations is presented in the following exhibit in comparison with the record of observations taken at this point where periodic fevers prevail.

EXHIBIT I.

DATE. 1878.	LITCHFIELD COUNTY, STATE OF CONNECTICUT.		OTISVILLE, MICHIGAN.		DATE. 1878.	LITCHFIELD COUNTY, STATE OF CONNECTICUT.		OTISVILLE, MICHIGAN.	
	Night.	Day.	Night.	Day.		Night.	Day.	Night.	Day.
Aug. 6	4	5	3	3	Sept. 9	0	2	4	2
" 7	4	4	3	3	" 10	0	3	2	3
" 8	3	3	3	4	" 11	0	4	2	2
" 9	4	6	3	4	" 12	2	3	------	3
" 10	4	4	3	4	" 13	1	3	4	4
" 11	3	4	1	1	" 14	0	2	4	1
" 12	3	4	* 0	3	" 15	2	3	1	2
" 13	1	3	3	3	" 16	0	2	5	3
" 14	0	2	4	3	" 17	0	3	2	3
" 15	0	3	4	3	" 18	0	3	3	3
" 16	2	3	4	3	" 19	------	3	------	3
" 17	2	3	1	3	" 20	2	2	3	4
" 18	2	4	1	3	" 21	1	2	3	3
" 27	0	3	† 0	3	" 22	2	3	1	3
" 28	1	3	3	3	" 23	0	2	3	2
" 29	1	3	4	4	" 24	0	2	3	4
" 30	1	2	1	4	" 25	2	3	3	3
" 31	0	3	3	4	" 26	1	2	4	3
Sept. 1	3	2	3	2	" 27	3	2	§ 1	2
" 2	0	2	4	3	" 28	1	3	3	3
" 3	0	3	4	4	" 29	0	3	4	2
" 4	2	1	3	3	" 30	0	2	4	2
" 5	4	1	‡ 0	3	Oct. 1	0	2	3	1
" 6	2	3	‡ 0	3	" 2	2	3	4	3
" 7	0	2	4	4	" 3	3	3	3	2
" 8	1	3	4	2	Average	1.38	2.82	2.77	2.90

* Heavy dew in morning.
† Great amount of moisture in night.
‡ Fog in morning.
§ Frost in morning.

The small quantity of ozone exhibited for the night in the record obtained from Connecticut, impresses one with the belief that some atmospheric conditions existed that failed to testify to the actual amount of ozone present. Excess of moisture appears to have been one of these conditions as reported by the observer to me.

As local conditions greatly affect the test for ozone, the observations that might be taken in other parts of this mountainous country might present results more in unison with the popular belief that active oxygen exists in greatest quantities amidst the mountains.

As spoken of, the velocity of the wind, if it is great, and the air is saturated with moisture, will occasion a decolorization of the test-paper unless protected from its influence. But if a test-paper be exposed to the free action of the wind when the air is not saturated with moisture a greater coloration will often occur than when *protected* from the action of the wind.

COLORATION OF BOTH SIDES OF THE TEST-PAPER.

Although Schönbein's test is considered the most reliable in use for the detection of ozone, something yet remains to be done in order to render even this test perfect, exclusive of the effects of such conditions as already have been mentioned.

In the manufacture of the test-paper used in this State, only one side of it is covered with the preparation that by chemical alteration and change of color enables us to estimate the relative amount of ozone present.* In examining the test-paper, after exposure, I have frequently found that the side of the paper upon which there was none of the preparation, exhibited the greater coloration. To determine, if possible, the cause of this, I recorded in a series of observations, as shown in the following exhibit, the degrees of coloration that appeared upon both sides of the paper. In the first series the number of observations was 34. In nineteen of these observations there was the deeper coloration on the side not having the preparation upon it. The same degree of coloration occurred upon both sides at once in 13 instances. There was a deeper coloration on the side containing the compound of starch and iodide of potassium, twice.

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*[Some test-paper prepared in Germany, examined by me, seemed to be like Swedish filter-paper; it was of loose texture, and on exposure was soon colored on both sides alike, but the degree of coloration was more uniform under varying conditions than it is on the paper used by the observers for this Board. The loose-texture paper seemed to be exceedingly prone to take on a color equaling from 2 to 4 on our scale, but did not seem to be as ready to show shades above or below those. On comparing it with our paper, it was found to fade quicker after being moistened, and I came to believe that it was not so accurate as is ours for the purpose of indicating the relative quantities of ozone in the atmosphere.—H. B. B., Sec. S. B. of H.]

EXHIBIT K. *First Series of Observations on the Influence of Relative Humidity upon the Coloration by Ozone of Both Sides of the Test-paper.*

	COLORATION, MARKED ON A SCALE OF 10°.		RELATIVE HUMIDITY.—PER CENT OF SATURATION OF THE AIR AT THE BEGINNING OF THE EXPOSURE WHEN THE COLORATION WAS AS SPECIFIED.			
	On Front of Test-paper.	On Back of Test-paper.	All Observations in the Series.	Greatest Color on Front of Paper.	Same Color on Both Sides.	Greatest Color on Back of Paper.
	2	2	82.3	----------	82.3	----------
	1	2	95.3	----------	----------	95.3
	2.5	3	95.3	----------	----------	95.3
	2	3	76.0	----------	----------	76.0
	2	3.5	84.2	----------	----------	84.2
	2.5	3.5	76.0	----------	----------	76.0
	2.5	3.5	74.9	----------	----------	74.9
	2.5	3.5	87.1	----------	----------	87.1
	1	2	100.0	----------	----------	100.0
	3.5	3	89.3	89.3	----------	----------
	1.5	2.5	81.4	----------	----------	81.4
	3.5	3.5	100.0	----------	100.0	----------
	3	3	100.0	----------	100.0	----------
	2	3.5	76.9	----------	----------	76.9
	2.5	2	100.0	100.0	----------	----------
	3.5	3.5	100.0	----------	100.0	----------
	2	3	53.7	----------	----------	53.7
	2.5	3.5	87.1	----------	----------	87.1
	2	2	93.2	----------	93.2	----------
	3	3.5	86.4	----------	----------	86.4
	3	4	85.8	----------	----------	85.8
	2.5	2.5	92.6	----------	92.6	----------
	3	3	92.8	----------	92.8	----------
	2.5	3.5	86.6	----------	----------	86.6
	2.5	3.5	93.1	----------	----------	93.1
	3	3.5	71.0	----------	----------	71.0
	3.5	3.5	100.0	----------	100.0	----------
	3	3	94.4	----------	94.4	----------
	3	3	100.0	----------	100.0	----------
	2.5	2.5	95.0	----------	95.0	----------
	3	3.5	85.8	----------	----------	85.8
	3	3	80.5	----------	80.5	----------
	1.5	2.5	69.4	----------	----------	69.4
	2.5	2.5	100.0	----------	100.0	----------
Total.....	85.5	102.5	2986.1	189.3	1230.8	1566.0
Averages.	2.51	3.01	87.8	94.7	94.7	82.4

Assistant Prof. F. S. Kedzie, of the Agricultural College, at Lansing, Mich., suggests that these conditions may appear from the existence of a thin film, or tough pellicle sometimes formed over the starch compound, thus preventing the access and ready action of ozone in setting free the iodine; the degree of coloration varying according to the condition of the surface of the test-paper, and according to certain conditions of atmospheric humidity existing at the time of the exposure of the test.

It is probably true that varying conditions of moisture have a marked influence with other influences producing the results referred to.

In 16 of the 19 instances when there was a deeper tint on the back of the paper the relative humidity was less than 90 per cent, ranging from 53 per cent upwards. In 3 instances where there was the deeper tint upon the back the relative humidity exceeded 90 per cent. In only one instance did the relative humidity amount to 100 per cent. In only three instances out of the 15 when the front had a coloration equal to that upon the back of the test-paper, or a greater coloration, the relative humidity was less than 90 per cent. In 12 instances when the coloration upon the front was equal to, or greater than that upon the back, the relative humidity exceeded 90 per cent. In 7 of the 15 instances when the degree of coloration on the front was equal to, or greater than, that upon the back, the relative humidity was 100 per cent. This would seem to prove that conditions of moisture have a decided influence in affecting the phenomena in question.

After an exposure of the test-paper for a time sufficient to produce a coloration, if there is a deeper tint upon the back than on the front side a removal of a thin portion of the starch from the front will not disclose as deep a tint as there is upon the back, nor will as marked a coloration appear in front until all the starch is removed, when both sides of the paper exhibit the same degree of discoloration.

The paper which is used in preparing the test readily absorbs a portion of the solution of iodide of potassium contained in the starch-compound, and on exposure to oxidizing elements exhibits chemical change as well as the prepared starch. The difference in the texture of the paper itself from the texture of the starch-compound would suggest the existence, in the paper and compound, of differing qualities for the absorption of moisture.

An *average* degree of moisture seems to be a condition rendering the paper saturated with a solution of iodide of potassium in starch-water a more delicate test than the starch and iodide of potassium test. Where *excess* of moisture obtains, the starch and iodide of potassium test appears to be the most reliable.

The preceding exhibit does not contain as extensive a series of observations as we would wish to have in order to establish conclusive evidence, but was all we had at the time of writing the foregoing. Since that time additional observations have been made, and the results are shown in the following exhibit.

EXHIBIT L.—*Second Series of Observations on the Influence of Relative Humidity upon the Coloration by Ozone of Both Sides of the Test-paper.*

	COLORATION, MARKED ON A SCALE OF 10°.		RELATIVE HUMIDITY.—PER CENT OF SATURATION OF THE AIR AT THE BEGINNING OF THE EXPOSURE WHEN THE COLORATION WAS AS SPECIFIED.			
	On Front of Test-paper.	On Back of Test-paper.	All Observations in the Series.	Greatest Color on Front of Paper.	Same Color on Both Sides.	Greatest Color on Back of Paper.
	3.5	3.0	100.0	100.0	----------	----------
	3.0	3.5	85.8	----------	----------	85.8
	3.5	4.5	75.5	----------	----------	75.5
	2.5	3.0	86.2	----------	----------	86.2
	1.5	3.0	83.4	----------	----------	83.4
	4.0	4.0	100.0	----------	100.0	----------
	3.5	3.0	100.0	100.0	----------	----------
	5.0	4.0	91.3	91.3	----------	----------
	3.5	2.5	85.8	85.8	----------	----------
	3.0	3.0	74.5	----------	74.5	----------
	2.0	3.5	75.9	----------	----------	75.9
	3.0	3.0	84.0	----------	84.0	----------
	3.0	3.0	91.4	----------	91.4	----------
	3.5	4.0	83.4	----------	----------	83.4
	3.0	2.5	83.4	83.4	----------	----------
	7.0	3.0	93.1	93.1	----------	----------
	3.0	2.0	100.0	100.0	----------	----------
	8.0	3.0	91.4	91.4	----------	----------
	3.0	2.5	91.6	91.6	----------	----------
	4.0	2.5	100.0	100.0	----------	----------
	3.0	2.5	100.0	100.0	----------	----------
	3.0	3.0	90.6	----------	90.6	----------
	2.5	4.0	100.0	----------	----------	100.0
	3.5	3.5	100.0	----------	100.0	----------
	4.0	4.5	79.7	----------	----------	79.7
	2.5	2.5	92.6	----------	92.6	----------
	2.5	3.0	84.0	----------	----------	84.0
	3.0	3.0	100.0	----------	100.0	----------
	4.0	3.0	92.6	92.6	----------	----------
	2.0	3.0	79.3	----------	----------	79.3
	2.5	3.0	69.6	----------	----------	69.6
	3.5	2.5	93.2	93.2	----------	----------
	3.0	3.0	100.0	----------	100.0	----------
	4.0	3.5	92.6	92.6	----------	----------
	3.5	3.5	100.0	----------	100.0	----------
	8.0	6.0	100.0	100.0	----------	----------
	6.0	5.0	90.5	90.5	----------	----------
	3.5	2.5	100.0	100.0	----------	----------
	3.0	4.0	83.4	----------	----------	83.4
Totals......	139.5	128.5	3524.8	1605.5	933.1	986.2
Averages...	3.58	3.29	90.4	94.4	93.3	82.2
Av. of both Series	3.08	3.16	89.2	94.5	94.1	82.3

In the foregoing exhibit the statement of the relative humidity is made for the time when the test-paper was put out for exposure. In nearly all the cases where there was *less* coloration on the back of the paper than on the front, and a relative humidity of *less* than 90 per cent at the time the test-paper was put out, the relative humidity was over 90 per cent when the paper was compared with the scale, showing that there was an increase of moisture after the paper was first exposed.

When the back of the paper was the most deeply colored, and on its first exposure the relative humidity was more than 90 per cent (another exception to the general rule), there was almost always a considerable decrease in the relative humidity.

SUGGESTIONS FOR IMPROVED METHODS OF OBSERVATIONS.

Negative results obtained by the exposure of Schönbein's test-paper in dwellings seem to be due as much to elements affecting the liberated iodine as to absence of ozone. This test, then, seems to be of little use in determining the presence of ozone in dwellings.

Valuable as are the general results of ozonometric observations, it is obvious that many of them are clouded with error. How to remove these errors is a subject important to all those interested in the study of ozonometry as to its meteorological, physiological, or pathological relations. Much study is yet necessary before the best methods for accurately estimating the quantity of ozone present at any time in the atmosphere will be determined. In the use of Schönbein's test, in order to obtain the maximum results of an observation where it is necessary to guard against excess of moisture, the exposure of a dry and wet slip at the same time, would appear to be a proper method to adopt; also to suspend them at such points as where the condensation of vapor would be least liable to occur. To make the period of time less for the exposure of the test-paper would be another means to obtain maximum results of an observation.

It is well known that by increased velocity of the wind more ozone may be carried to a given point than there would be if the velocity were less. To determine the quantity of ozone, therefore, liable to affect the health of an individual subjected to the influence of rapid currents of air, it is desirable to expose the test-paper to the same current. But the loss of the liberated iodine as a result of such exposure, suggests that in order to obtain the *deepest* coloration the slip must be protected from too great velocity of the wind, especially when there is an excess of moisture in the atmosphere.

THE

PRINCIPAL METEOROLOGICAL CONDITIONS IN MICHIGAN

DURING THE YEAR 1879:

A Compilation Based upon Reports by the

METEOROLOGICAL OBSERVERS

FOR THE

STATE BOARD OF HEALTH,

AND FOR THE U. S. SIGNAL SERVICE.

COMPILED AND PREPARED IN THE OFFICE OF THE SECRETARY OF THE BOARD,
LANSING, MICHIGAN.

THE PRINCIPAL METEOROLOGICAL CONDITIONS IN MICHIGAN DURING THE YEAR 1879.

In the two Reports preceding this, were published summaries of the principal meteorological conditions in Michigan during the years 1877 and 1878. For 1879 observations were continued at the old stations, and reports were received from eight new stations, from four of them by the courtesy of the United States Signal Service.* The new stations were Marquette, Menominee, Alpena, Grand Haven, Port Huron, State House of Correction at Ionia, Washington (Macomb Co.), and the office of the State Board of Health, Lansing. The names of observers and their places of observation are given in Exhibit 7, page 306. Observations for less than half the year have not been used in this article, and observations not for the full year have not been included in the average lines made for the several localities represented in the various tables. A copy of the monthly register in use was printed on page 216 of the Report for 1878, and suggestions as to the use of meteorological data were given on pages 213–14 of that Report.

USES DESIGNED TO BE MADE OF THESE METEOROLOGICAL DATA.

The facts tabulated and otherwise embraced in this article are collected with a view to their use in studies relating to the causes of sickness and deaths in Michigan. They have been carefully digested and prepared, and are here presented in such form as to be available for use in connection with the facts respecting sickness in Michigan, grouped in the article following this, and entitled "Weekly Reports of Diseases in Michigan, in 1879." They are also available for use in connection with the article on "Diseases in Michigan in 1879," on pages 221–262 of this Report; and they will be found useful for study in connection with the records of deaths in Michigan during the same year which are returned by the Supervisors, to be published by this State under the title of the "Vital Statistics of Michigan." It seems probable, however, that many physicians and sanitarians may have occasion in the future to employ the evidence here placed upon record, in connection with facts which are known only to themselves, and which will only become of sufficient value to warrant their being made public by reason of the evidence herein contained.

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* The following stations of the U. S. Signal Service kindly sent to this office for the year 1879 monthly reports of their regular, tri-daily observations, in many cases corrected and reduced, and for the most part on blanks supplied from this office: Alpena, Detroit, Grand Haven, Marquette, and Port Huron. The observers at these stations also made observations of ozone especially for this Board. For study in connection with reports of sickness some of the observations require a different elaboration from that given to them by the Signal Service Office. This is true especially of the record of atmospheric pressure, which for study with sickness-reports requires to be corrected for temperature and instrumental error but not to be reduced to sea level. To the Chief Signal Officer at Washington is sent each month a copy of the register of observations made at this office, and each week a copy of the weekly summary of said observations, which is published in the Lansing Republican, and a copy is also sent to every observer reporting to this office.

EXHIBIT 7.—*Names of Observers whose Reports are summarized in the following Meteorological Tables and Diagrams, their Places of Observation, and the Counties and Geographical Divisions of the State, in which these Places are situated.*

NAME OF OBSERVER.	PLACE OF OBSERVATION.	COUNTY.	GEOGRAPHICAL DIVISION OF THE STATE.*
Sergt. J. T. O'Keefe, U. S. Signal Corps[a] Sergt. J. Gilligan, U. S. Signal Corps[b]	Marquette	Marquette	Upper-Peninsular.*
Rev. A. W. Bill	Menominee	Menominee	Upper-Peninsular.
H. T. Calkins, M. D.	Petoskey	Emmet	Northern.
Sergt. Jas. A. Barwick, U. S. Signal Corps	Alpena	Alpena	North-eastern.
Sergt. S. C. Emery, U. S. Signal Corps[c] Corpl. D. T. Waters, U. S. Signal Corps[d]	Grand Haven	Ottawa	Western.
Lee S. Cobb	Nirvana	Lake	Western.
Sergt. W. O. Bailey, U. S. Signal Corps	Port Huron	St. Clair	Bay and Eastern.
John S. Caulkins, M. D.	Thornville	Lapeer	Bay and Eastern.
Prof. R. C. Kedzie[e]	Agricultural College, near Lansing.	Ingham	Central.
J. J. Grafton, M. D., Warden	State House of Correction, Ionia.	Ionia	Central.
Frank S. Kedzie[f] Morey S. Collier[g] Harry B. Turner[h]	Office State Board of Health, Lansing.	Ingham	Central.
A. W. Nicholson, M. D.	Otisville	Genesee	Central.
John Bell, M. D.	Benton Harbor	Berrien	South-western.
James S. Reeves, M. D.	Niles	Berrien	South-western.
John H. Kellogg, M. D.	Battle Creek	Calhoun	Southern-central.
Lyman P. Alden, Supt.	State Public School, Coldwater	Branch	Southern-central.
A. M. Munn	Michigan Asylum for Insane, Kalamazoo.	Kalamazoo	Southern-central.
Edwin Stewart, M. D.	Mendon	St. Joseph	Southern-central.
Harrison Peters, M. D.	Tecumseh	Lenawee	Southern-central.
Prof. Lewis McLouth Lawrence A. McLouth	State Normal School, Ypsilanti	Washtenaw	Southern-central.
Sergt. Theo. V. Van Heusen, U. S. Signal Corps[i] Sergt. C. F. R. Wappenhaus, U. S. Signal Corps[j]	Detroit	Wayne	South-eastern.
F. W. Higgins, Supt.	Woodmere Cemetery, near Detroit.	Wayne	South-eastern.
Albert Yates, M. D.	Washington	Macomb	South-eastern.

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* The counties included in each division are stated in Exhibit 1, page 227.

[a] For July, and from Sept. to Dec. [b] From Jan. to June, and for August. Sergt. Gilligan, who took charge of the station at Marquette in January, 1880, kindly sent copies of records for the first months of 1879 made by his predecessor, who had begun reporting to the State Board of Health in July, 1879. [c] From Jan. to Sept. [d] From Oct. to Dec. [e] The statements for the Agricultural College for 1879 are taken from Prof. Kedzie's "Register of Meteorological Conditions" in the Report of the State Board of Agriculture for 1879. For November and December they are copied from observations made in the office of the State Board of Health, Lansing. [f] From Jan. to May [g] From June to Aug. [h] From Sept. to Dec. [i] From Jan. to March. [j] From April to Dec.

DIAGRAMS RELATING TO METEOROLOGICAL CONDITIONS IN 1879.

The relative intensity or prevalence of the several meteorological conditions in different months is best understood when represented to the eye by curved or angular lines, the rise and fall of which accurately depict according to a fixed scale the relative intensity or prevalence of the condition. Fourteen such diagrams have been made for 1879. By means of these in connection with the diagrams for 1877 and 1878, in the summaries for those years in the Reports for 1878 and 1879, a ready comparison may be had of conditions in these years. These diagrams may also be studied in connection with the diagrams relating to sickness in a paper on "Weekly Reports of Diseases in Michigan," on later pages of this Report; and this is the main purpose of their construction. In studying these diagrams it should be remembered that the significant points are to be found in and not between the upright lines for the several months, as named at the top of these lines. Diagrams so made seem to be more easily read than those with the significant points between the upright lines. It should be remembered also that although the irregular lines crossing the diagrams from left to right do not necessarily represent the exact course or range of the several conditions from month to month (except in the cases in which there may have been a *uniform* increase or decrease from one month to another), yet they serve to guide the eye from the significant point in the upright line for one month to that in the line for the next month.

As seems most proper, it has been sought, by making the heads and notes to these diagrams as nearly self-explanatory as possible, to save the reader needless trouble in turning from page to page in order to find to what the diagram relates or how it is to be read. The following explanations, however, may be repeated, slightly modified, from the Report of 1879, to aid those not familiar with this method of graphic statement:—

The intersection of the irregular line crossing the diagram from left to right and representing conditions at any locality, with the perpendicular line for any month marks the degree or the amount intended to be indicated for that month at that locality. This degree or amount may readily be determined by following the nearest horizontal line to the number stated in the left-hand margin of the diagram, and, if necessary, adding or subtracting a quantity proportional to the distance of the said point of intersection above or below that horizontal line. In the tables these degrees or amounts are definitely stated for each condition at each locality, and to the tables reference may easily be made from any diagram by considering the subject of the diagram. For convenience of reference, the diagrams are in most cases printed opposite the tables from which they are made, and which they are designed to illustrate. Diagrams XI., XII., and XIII., relating to the direction of the wind, are somewhat differently constructed and require separate explanation.

DIAGRAMS XI., XII., AND XIII., RELATIVE TO THE DIRECTION OF THE WIND.

The figures or separate groups of lines in these diagrams are designed to indicate the number and the proportion of regular observations, at 7 A. M., 2 P. M., and 9 P. M. daily, at which the wind was blowing from each of the eight principal points of compass at the places and for the periods of time stated in the margin. The points of compass are represented as is usually done on maps, namely,—north, by the top of the page; south, by the bottom; east by the right-hand; and west, by the left-hand side. Each figure consists of lines drawn to a common center from some or all of the following directions on the page, and indicating that at the times of observation the wind blew from points of the compass as follows: Lines toward the common center from the top of the page indicate that the wind blew from the north; from the right-hand side, that the wind was from the east; from the bottom of the page, that it was from the south; from the left-hand side, that it was from the west; from the upper left-hand corner, that it was from the north-west; from the upper right-hand corner, that it was from the north-east; from the lower right-hand corner, that it was from the south-east; from the lower left-hand corner, that it was from the south-west. The length of each line denotes the number of regular observations at which the wind blew from the given direction, .01 of an inch being the unit, or the length of line for one observation. The circles indicate calms, the number of regular observations at which there was no wind being denoted by the length of the radius of the circle drawn about the point of convergence of the lines for a given place or period of time, the length for one observation being, as before, .01 of an inch.

ERRORS IN ENGRAVING DIAGRAMS.

Great care has been taken to have the diagrams carefully drawn to scale. In the engraving of some of the plates, however, slight errors have occurred.

Diagrams I.-XIV., relating to meteorological conditions, were drawn to a scale twice as great as stated at the foot of the diagrams, with instructions to the photo-engraver to reduce them one-half in length and one-half in width. Diagram XIII., page —, was, however, so reduced as to be twenty-two-fiftieths of an inch less in length than designed; and the other dimensions are therefore proportionally less. This error makes the longer line for each direction of the wind from one to three hundredths of an inch shorter than designed in the statement of the scale. The error in Diagram XI., page ..., is about two-thirds as great; and in Diagram XII., page ..., about one-fourth as great. The exact number of observations for each direction of the wind is stated in Tables XI., XII., and XIII., pages ..., ..., ... Diagrams IX. and X., also, pages ... and ..., relating to the velocity of the wind at Lansing, are about twenty-one-fiftieths of an inch shorter than designed, and in them also the significant dimensions are proportionally less than stated in the "scales." The other diagrams vary not to exceed one-fiftieth to one-tenth of an inch in length from what they were designed. In any close comparisons of conditions, reference should, of course, be made to numbers in the tables.

THE MANNER OF USING THESE DIAGRAMS.

Persons unaccustomed to the use of diagrams, or not familiar with this particular study, sometimes remark that they are unable to follow all the lines, and therefore think they fail to get the ideas intended to be conveyed, which is probably the fact, for the reason that they look in a wrong direction. To such persons it is proper to explain that while it is desirable in some diagrams to endeavor to follow each line through its entire course, some of these diagrams are planned to show by other methods other facts believed to be of fully as much importance; as, for instance, in the two diagrams relating to the average temperature and the absolute humidity, it is shown that at several stations quite widely separated, the temperature and the absolute humidity did not vary much from the averages at the other stations. That many lines disappear behind others is an important part of the evidence, because showing that the conditions were the same at many places, and even at places widely remote from each other. If only two or three stations at which the conditions were sufficiently different to permit of following their lines distinctly, apart from the others, had been represented on these diagrams, nothing would have been gained for our present main purpose (which is to get a good knowledge of the meteorology of the State as a whole, for use in study in connection with the reports of sickness which thus far are represented by diagrams and studied for the State as a whole); but much would have been lost because those diagrams gain very great strength from the general concurrence of the evidence (much as a rope is strengthened by the entwisting of its separate twines), which is such a strongly marked feature in each of them.

It may be stated as generally applicable to the diagrams in this part of the Report, that one important idea intended to be conveyed first of all, is the general tendency of the evidence. If special details are wanted, the reader should usually look for them in the tables which accompany the diagrams, although in some cases it is possible to trace details in the diagrams. In most of the diagrams except such as the one on average temperature and the one on absolute humidity, in which the average of many stations is sufficiently manifest without a special line to show it, the average for all stations or for many stations, is represented by a line of xxxx's, which can be followed with the eye without difficulty. It is this average line or the average evidence of a diagram of a meteorological condition which should be studied in connection with each particular line which in the diagrams further on in this Report represents the average rise and fall of a disease in the State, considered as a whole.

In the diagrams representing distinct diseases it is usually designed to represent only so many on one diagram as will permit of the line for each disease being readily followed. By this means clear ideas in one direction are gained, though something is lost in the way of showing the natural relationships of the several diseases, but where it is practicable this is also kept in mind, and when the necessity is here pointed out, the reader can study that subject by picking out from each diagram the diseases which are evidently related to those represented on other diagrams. Similar remark is applicable to the diagrams of meteorological conditions, many of which it may be seen bear close relations to each other.

EXHIBIT 8.—*Statements of Meteorological Conditions in the Year and in each Month of the Year 1879, Compared with Annual and Monthly Averages for 1878 and for several Stated Periods of Years,—from Observations by Prof. R. C. Kedzie, at the State Agricultural College*, near Lansing, Michigan.*

METEOROLOGICAL CONDITIONS.	1879 COMPARED WITH AVERAGES FOR PREVIOUS YEARS.		In 1879	METEOROLOGICAL CONDITIONS.	1879 COMPARED WITH AVERAGES FOR PREVIOUS YEARS.		In 1879
	No. of Years Averaged, ending with 1878.	More (+), or Less (-), in 1879 than the Average for Previous Years.	More (+), or Less (-), than in 1878.		No. of Years Averaged, ending with 1878.	More (+), or Less (-), in 1879 than the Average for Previous Years.	More (+), or Less (-), than in 1878.
YEAR 1879.*				YEAR 1879.—*Continued.*			
Av. Temp'ature	15	+0.24° F.	-1.41° F.	Rainfall..........	15	-3.62 in.	-5.17 in.
Range of Temp†	6	+1°	+10°	Day Ozone.....§	7	-.52°	-.26°
Av. Monthly Range of Temp.†........	6	+3°	+10°	Night Ozone...§	7	-.75°	-.06°
Av. Daily Range of Temp.‡....	9	-0.65°	+1.34°	Atmospheric Pressure......	4	+.067 in.	+.042 in.
Cloudiness......	15	-5 per ct.	-4 per ct.				
JANUARY.				FEBRUARY.			
Av. Temp.......	15	-3.21°	-9.92°	Av. Temp.......	15	-3.97° F.	-7.67° F.
Range of Temp.†	6	+2°	+10°	Range of Temp†	6	-12°	-15°
Av. Daily Range of Temp.‡....	9	+2.18°	+4.65°	Av. Daily Range of Temp......‡	9	-4.37°	-3.09°
Cloudiness......	15	-6 per ct.	-8 per ct.	Cloudiness......	15	+10 per ct.	+17 per ct.
Rainfall..........	15	-1.27 in.	-.63 in.	Rainfall..........	15	-27 in.	-1.31 in.
Day Ozone.....§	7	-.87°	+.26°	Day Ozone.....§	7	-.43°	-.46°
Night Ozone...§	7	-1.30°	0	Night Ozone...§	7	-.90°	-.32°
Atmospheric Pressure......	4	+.071 in.	+.031 in.	Atmospheric Pressure......	4	+.085 in.	+.081 in.
MARCH.				APRIL.			
Av. Temp.......	15	+1.70°	-7.71°	Av. Temp.......	15	-1.14°	-5.71°
Range of Temp.†	6	-4°	+8°	Range of Temp†	6	+7°	+23°
Av. Daily Range of Temp......‡	9	-2.19°	+0.68°	Av. Daily Range of Temp.....‡	9	+2.59°	+4.96°
Cloudiness......	15	-9 per ct.	-16 per ct.	Cloudiness......	15	-14 per ct.	-15 per ct.
Rainfall..........	15	-1.26 in.	-1.55 in.	Rainfall..........	15	-1.24 in.	-2.51 in.
Day Ozone.....§	7	-.90°	-.75°	Day Ozone.....§	7	-.94°	-1.37°
Night Ozone...§	7	-1.66°	-.64°	Night Ozone...§	7	-.92°	-.53°
Atmospheric Pressure......	4	+.157 in.	+.075 in.	Atmospheric Pressure......	4	+.076 in.	+.175 in.

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* For November and December, 1879, the observations were made by Harry B. Turner, at the office of the State Board of Health, Lansing.

† By registering thermometers, set at 7 A. M., and recorded at 7 A. M. for the preceding calendar day.

‡ By observations at 7 A. M., 2 P. M., and 9 P. M., daily.

§ Degrees, by scale of 10 degrees of coloration of Schönbein's test-paper, exposed from 7 A. M. to 2 P. M., for the day observation; and from 9 P. M. to 7 A. M., for the night observation.

EXHIBIT 8.—CONTINUED.—*Meteorological Conditions in Months of the Year 1879, Compared with Averages for Corresponding Months in Preceding Years.*

METEOROLOGICAL CONDITIONS.	1879 COMPARED WITH AVERAGES FOR PREVIOUS YEARS.		In 1879 More (+), or Less (-), than in 1878.	METEOROLOGICAL CONDITIONS.	1879 COMPARED WITH AVERAGES FOR PREVIOUS YEARS.		In 1879 More (+), or Less (-), than in 1878.
	No. of Years Averaged, ending with 1878.	More (+), or Less (-), in 1879 than the Average for Previous Years.			No. of Years Averaged, ending with 1878.	More (+), or Less (-), in 1879 than the Average for Previous Years.	
MAY.				JUNE.			
Av. Temp.	15	+0.66° F.	+4.19° F.	Av. Temp.	15	-2.40° F.	+1.94° F.
Range of Temp.†	6	+5°	+18°	Range of Temp†	6	+8°	+7°
Av. Daily Range of Temp.‡	9	+2.27°	+5.60°	Av. Daily Range of Temp.‡	9	-0.56°	+0.80
Cloudiness	15	-12 per ct.	-14 per ct.	Cloudiness	15	-7 per ct.	-2 per ct.
Rainfall	15	-.40 in.	-.99 in.	Rainfall	15	-1.00 in.	-.28 in.
Day Ozone §	7	-.93°	-1.18°	Day Ozone §	7	-.55°	-.74°
Night Ozone §	7	-1.40°	-1.42°	Night Ozone §	7	-.84°	-.97°
Atmospheric Pressure	4	+.081 in.	+.103 in.	Atmospheric Pressure	4	+.075	+.043
JULY.				AUGUST.			
Av. Temp.	15	+2.02°	+0.99°	Av. Temp.	15	+0.87°	-0.15°
Range of Temp.†	6	0	-1°	Range of Temp.†	6	+7°	+11°
Av. Daily Range of Temp.‡	9	-0.16	+2.52	Av. Daily Range of Temp.‡	9	+1.19°	+1.35°
Cloudiness	15	-11 per ct.	-1 per ct.	Cloudiness	15	-13 per ct.	-5 per ct.
Rainfall	15	-1.14 in.	-.77 in.	Rainfall	15	-1.03	-.24
Day Ozone §	7	+.51°	+.80°	Day Ozone §	7	-.07°	+.26°
Night Ozone §	7	-.03°	+.39°	Night Ozone §	7	+.01°	+.24°
Atmospheric Pressure	4	+.007 in.	-.028 in.	Atmospheric Pressure	4	+.068 in.	+.090 in.
SEPTEMBER.				OCTOBER.			
Av. Temp.	15	-4.13°	-6.94°	Av. Temp.	15	+9.83°	+8.95°
Range of Temp.†	6	0	-3°	Range of Temp.†	6	+12°	+11°
Av. Daily Range of Temp.‡	9	-3.33°	-1.30°	Av. Daily Range of Temp.‡	9	-1.54°	-0.54°
Cloudiness	15	-3 per ct.	+2 per ct.	Cloudiness	15	-4 per ct.	+1 per ct.
Rainfall	15	+.20 in.	-.24 in.	Rainfall	15	-.74	-.42
Day Ozone §	7	+.20°	+.64°	Day Ozone §	7	-.17°	+.61°
Night Ozone §	7	+.26°	+.93°	Night Ozone §	7	-.86°	+.84°
Atmospheric Pressure	4	+.076 in.	-.005 in.	Atmospheric Pressure	4	+.134 in.	+.080 in.
NOVEMBER.*				DECEMBER.*			
Av. Temp.	15	+3.01°	+1.93°	Av. Temp.	15	+2.46°	+6.17°
Range of Temp.†	6	+9°	+25°	Range of Temp.†	6	+7°	+23°
Av. Daily Range of Temp.‡	9	-2.16°	-0.67°	Av. Daily Range of Temp.‡	9	-1.83	+0.81
Cloudiness	15	0	0	Cloudiness	15	+8 per ct.	-5 per ct.
Rainfall	15	+2.67 in.	+2.39 in.	Rainfall	15	+1.73	+1.29
Day Ozone §	7	-.46°	+.36°	Day Ozone §	7	-1.61°	-1.58°
Night Ozone §	7	-.08°	+1.49°	Night Ozone §	7	-1.35°	-.87°
Atmospheric Pressure	4	-.006 in.	-.040 in.	Atmospheric Pressure	4	-.025 in.	-.101 in.

* For November and December 1879 the observations were made by Harry B. Turner, at the office of the State Board of Health, Lansing.

† By registering thermometers. ‡ By observations at 7 A. M., 2 P. M. and 9 P. M., daily.

§ Degrees, by scale of 10 degrees of coloration of Schönbein's test-paper, exposed from 7 A. M. to 2 P. M., for the day of observation; and from 9 P. M. to 7 A. M., for the night observation.

METEOROLOGICAL CHARACTERISTICS OF THE YEAR 1879.

By the comparison in Exhibit 8, pages 309–310, of conditions at the Agricultural College in 1879, with averages for preceding periods of years, it would seem that the average temperature, the ozone, and the atmospheric pressure varied but little from those averages for those periods. The cloudiness was about 5 per cent less, and the rainfall 3.62 inches less than the average for the preceding 15 years. In November and December the rainfall was greater than the average for the preceding 15 Novembers and Decembers.

TEMPERATURE.

The average temperature seems to have been lower in 1879 than in 1878 from January to April, inclusive, and in September; and higher in May, June, October, November, and December. Compared with the average for 15 preceding years the average temperature at the Agricultural College in 1879 was considerably lower in January, February, and September, and considerably higher in July, October, November and December. The average temperature at the Agricultural College in October, 1879, was more than 3° higher than that of any October in the preceding 15 years, and more than 8° higher than the average October temperature for that period.

The unusual high temperature in the first part of October, 1879, is well shown by the following record of temperature of water in Cedar River, near the Agricultural College, taken from the 6th to the 9th of October in each of the years 1874–1880, and kindly contributed by Prof. R. C. Kedzie.

EXHIBIT 9.—*Temperature of Water in Cedar River, taken October 6–9, for the Years 1874–80.*

	Average, 7 Years, 1874-80.	1874.	1875.	1876.	1877.	1878.	1879.	1880.
Temp. of water in Cedar River, taken from 6th to 9th of Oct., Degrees Fahr.	54°.6	54°	50°	46°	50°	60°	68°	54°

The following record of the mean October temperature for each of the 10 years, 1870–9, at Woodmere Cemetery, near Detroit, is by Superintendent F. W. Higgins:

EXHIBIT 10.—*Average October Temperature.*

	Aver'ge, 10 Yrs., 1870-9.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.
Mean October temperature	49.81	53.9	52.0	49.3	46.7	49.5	44.8	44.3	51.8	49.4	56.4	......

The average temperature for the year 1879, at the Agricultural College, varied less than one degree from the average for the preceding 15 years. The average temperature for 19 stations in 1879 was the same for both September and October, viz., 57°.43.

The average daily range of the 7 A. M., 2 P. M., and 9 P. M. observations at the Agricultural College varied less than one degree for the year 1879 from the average for the preceding 9 years; for February, March, September, and November it was more than 2° less than the average for the corresponding months of the preceding 9 years; and for January, April, and May it was more than 2° greater than the average for the corresponding months in the same period. The average temperature in 1879, as observed at the office of the State Board of Health, Lansing, was about 2°.20 higher than as observed at the State Agricultural College. The average for the 10 months, January to October inclusive, during which observations were made at the College, was 2°.41 higher at the office of the State Board of Health than at the College. The difference is greatest in the cold months. This difference in the temperature of two places so near may be in part explained by the fact that the instruments at the office of the Board of Health are placed too near the capitol building, are influenced by radiation of heat from the building, and by warm currents of air ascending near the building; and also in part by the fact that at the office of the State Board of Health the observations, broken up by moving into the new capitol, were not commenced for 1879 till January 16, after the coldest weather of the month and of the year was over. It is probable that the average temperature given for November and December, 1879, at the College, in Exhibit 12, being taken from the observations at the State Board of Health office, are somewhat too high; and that the average for the year 1879 is thereby made a little too high. By Table III., pages 322–3, giving the extremes of temperature for the year, and by months of the year 1879, it seems that for the year the range of temperature at the College and at the office of the State Board of Health was the same; but it will be noticed that in most months the minimum at the College was lower than at the office of the State Board of Health. The 20° given as the minimum for January at the office of the State Board of Health, was the only observation made during the first six days of that month. The maximum is one or two degrees higher at the College in several months, and is from one to six degrees higher at the office of the State Board of Health in other months.

The following comments relative to temperature are taken from the meteorological registers for months named:—

DEPTH OF GROUND FROZEN.

Place.	Date.	Depth.
Thornville.	January 31.	Open places about 10 inches; sheltered 0.
"	February 28.	Exposed knolls, 18 inches; sod, 8 or 10 inches; in the woods scarcely at all.
Tecumseh.	(March register.)	About 15 inches the past winter.
Thornville.	March 31.	Mostly out of ground; ice still on lakes and ponds; snowbanks on declivities.
Thornville.	(November register.)	But little frost in ground.
Thornville.	(December register.)	Not deeply.

The ground is entirely bare of snow (Feb. 1), and but a few inches have covered it at any time. This may account for the depth of ice on the bay.—*Rev. A. W. Bill, of Menominee, on January (1879) register.*

Navigation opened March 20.—*S. C. Emery, Sergt. Signal Corps, U. S. A.. Grand Haven.*

Ice out of river April 11.—*Jas. A. Barwick, Sergt. Signal Corps, U. S. A., Alpena.*

Trees covered with rime at Thornville, Jan. 12, Feb. 19 (in the morning), and Dec. 17 (loaded with ice), 1879.

EXHIBIT 11.—*Latitude and Longitude, Elevation above Sea Level, and the Average Temperature, and Average Barometric Pressure in 1879, at 23 Meteorological Stations in Michigan,—the names of the Stations being arranged in order by Latitude, highest first.*

LOCALITIES IN ORDER OF LATITUDE,—THOSE FARTHEST NORTH, FIRST.	Latitude, North.	Longitude West from Greenwich.	Altitude (Approximate), above Sea Level.—Feet.	Height of Mercury in Cistern of Barometer, above Sea Level.	Average Temperature, 1879.—Degrees F.	Average Atmospheric Pressure, 1879.—Inches of Mercury, Corrected for Temp.
Marquette	46°33′	87°36′	636.22	666.33	43.14	29.267
Petoskey	*45°22′	*84°57′	§637.	----------	42.20	----------
Menominee	*45°6′	*87°35′	----------	----------	----------	----------
Alpena	45°5′	83°28′	587.9	609.5	42.39	29.340
Nirvana	*43°54′	*85°42′	‖980	----------	44.85	29.054
Otisville	43°13′	83°31′	820	----------	46.58	----------
Grand Haven	43°5′	86°18′	593.3	616.3	48.08	29.359
Ionia	†42°59′	85°4′	688.10	----------	----------	----------
Port Huron	42°58′	82°29′	600	630.	45.97	29.341
Thornville	*42°55′	*83°12′	‖975	980.	48.11	----------
Agricultural College, near Lansing	42°44′	84°29′	834.	----------	----------	----------
Lansing	‡42°44′	†84°33′	§800	----------	49.14	29.044
Washington	42°40′	83°	746.33	752.33	46.44	29.135
Detroit	42°20′	83°2′	593	645.	48.42	29.348
Battle Creek	*42°20′	*85°11′	§800	----------	50.17	28.655
Woodmere Cemetery, near Detroit	42°18′	83°5′	588	590.	46.68	29.387
Kalamazoo	*42°18′	*85°35′	§782	----------	47.57	29.099
Ypsilanti	*42°15′	*83°36′	§700	----------	49.39	28.942
Benton Harbor	*42°8′	*86°28′	§582	----------	----------	----------
Mendon	*42°2′	*85°29′	§872	----------	47.08	----------
Tecumseh	*42°1′	*83°57′	§821	----------	46.59	29.041
Coldwater	*41°58′	*85°0′	§989	----------	48.35	----------
Niles	*41°51′	*86°16′	§695	----------	48.45	----------

* Estimated from lines on a map of Michigan issued by the General Land Office, Department of the Interior, 1878. For stations not thus marked the latitude and longitude were stated by the observer on the meteorological registers received.

† The exact latitude and longitude of the astronomical post at Ionia is 42°58′ 52″.53 N., and 85°03′ 49″.20 W.

‡ The exact latitude and longitude of the astronomical post placed in the ground near the new Capitol at Lansing, by the U. S. Lake Survey in 187., as determined by observations then made, is 42°43′ 53″.11 N., and 84°33′19″.68 W.

§ Estimated from data on "Railroad Profiles," pages 179-187, Annual Report of the State Board of Health for 1878.

‖ Estimated from data on Tackabury's Atlas of the State of Michigan.

EXHIBIT 12.—*Comparison of the Average Temperature during the Year and during each Month of the Year 1879, with the Annual and Monthly Averages for the Year 1878, and with the Average for the fifteen Years 1864–78.—Observations made by Prof. R. C. Kedzie, at the State Agricultural College*, near Lansing, Michigan.*

YEARS, ETC.	AVERAGE (MEAN) TEMPERATURE,—DEGREES FAHR.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.*	Dec.*
Av. for 15 years, 1864–78	46.64	22.40	24.37	31.49	45.98	58.10	68.42	72.01	69.13	60.34	47.45	35.21	25.00
1878	48.29	29.11	28.07	40.90	50.55	54.57	64.08	73.04	70.15	63.15	48.33	36.29	21.29
1879*	46.88	19.19	20.40	33.19	44.84	58.76	66.02	74.03	70.00	56.21	57.28	38.22	27.46
In 1879 **Higher** than Av. 15 years, 1864–78	.24	------	------	1.70	------	.66	------	2.02	.87	------	9.83	3.01	2.46
In 1879 **Lower** than Av. 15 years, 1864–78	--------	3.21	3.97	------	1.14	------	2.40	------	------	4.13	------	------	------
In 1879 **Higher** than in 1878	--------	------	------	------	------	4.19	1.94	.99	------	------	8.95	1.93	6.17
In 1879 **Lower** than in 1878	1.41	9.92	7.67	7.71	5.71	------	------	------	.15	6.94	------	------	------

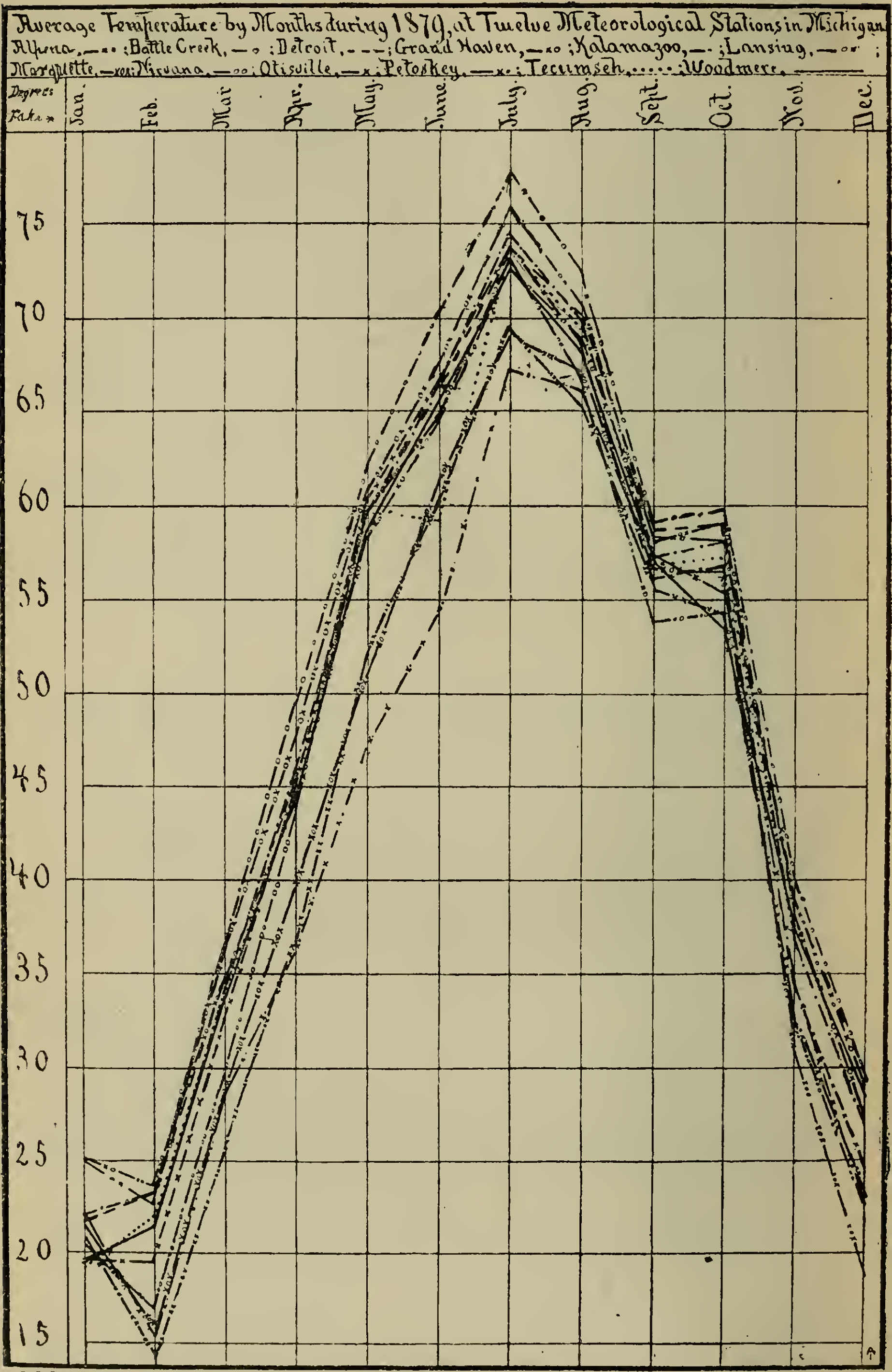
* For November and December, 1879, the observations were made by Harry B. Turner, at the office of the State Board of Health, Lansing.

EXHIBIT 13.—*Comparison, by Year and Months, of the Average Daily Temperature at 19 Localities (in Michigan) in 1879 with the Average in 1878 at 14 Localities.**

YEARS, ETC.	AVERAGE TEMPERATURE,—DEGREES FAHR.												
	Annual Av.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. at 14 Stations in 1878	49.24	27.17	29.75	41.46	52.27	54.73	65.18	74.22	70.92	63.99	50.13	38.34	22.74
Av. at 19 Stations in 1879	46.82	20.86	20.69	33.08	44.29	58.03	64.70	73.16	68.99	57.43	57.43	36.80	26.41
In 1879 **Greater** than in 1878	------	------	------	------	------	3.30	------	------	------	------	7.30	------	3.67
In 1879 **Less** than in 1878	2.42	6.31	9.06	8.38	7.98	------	.48	1.06	1.93	6.56	------	1.54	------

* Thirteen of the stations, Petoskey, Nirvana, Otisville, Thornville, Niles, Battle Creek, Coldwater, Kalamazoo, Mendon, Tecumseh, Ypsilanti, Detroit, and Woodmere Cemetery, were the same for both years; Benton Harbor was included in the average for 1878 but not in that for 1879; and five, Marquette, Alpena, Grand Haven, Port Huron, Lansing, and Washington (Macomb Co.), were included in the average for 1879 but not in that for 1878.

DIAGRAM NO. I.—TEMPERATURE, BY MONTHS IN 1879.



*SCALE, 10 Degrees F. to an Inch, vertically.
Designed by Henry B. Baker. Drawn by H. B. Turner & Jno. K. Allen.

TABLE I.—*Average Temperature, in Degrees Fahr., for the Year, and for each Month of the Year 1879, at each of 23 Stations in Michigan, and also the Average for 19 of the Same Stations—as indicated by the Average of Observations made Daily at 7 A. M., 2 P. M., and 9 P. M., by Observers* for the State Board of Health, and for the U. S. Signal Service.*

STATIONS IN MICHIGAN.*	Geographical Divisions of the State.†	TEMPERATURE, IN DEGREES FAHR.													
		YEAR.		MONTHS, 1879.											
		1878.	1879.	Jan.	Feb.	Mar.	Apr.	May.	J'ne.	J'ly.	Aug.	Sept.	Oct.	Nov.	Dec.
AV. FOR 19 STATIONS ‡	----------	[a]	46.82	20.86	20.69	33.08	44.29	58.03	64.70	73.16	68.99	57.43	57.43	36.80	26.41
Marquette *	U. P.†	-----	43.14	21.38	15.83	28.63	39.67	50.81	61.53	68.90	67.22	56.58	56.49	32.13	18.55
Menominee	U. P.	-----	[b]	16.43	13.07	27.62	38.92	56.16	65.72	74.10	69.72	58.40	57.14	33.57[f]	-----
Petoskey	N.	46.80	42.20	22.05	15.31	28.57	36.09	47.00	54.21	67.32	66.14	57.30	55.37	34.52	22.53
Alpena	N. E.	-----	42.39	20.66	14.12	25.37	36.74	52.22	60.17	69.57	65.25	55.54	54.22	32.79	22.08
Grand Haven	W.	-----	48.08	25.10	23.57	34.73	44.32	58.34	64.56	72.70	68.88	58.34	58.06	39.40	29.00
Nirvana	W.	47.15	44.85	20.52	16.77	29.30	43.46	59.48	64.86	73.18	66.92	53.77	54.39	32.76	22.75
Port Huron	B. & E.	-----	45.97	20.41	19.82	31.89	41.39	55.74	62.73	71.66	68.26	57.60	57.49	37.02	27.61
Thornville	B. & E.	49.09	48.11	20.46	20.64	33.66	45.40	60.60	67.29	75.54	71.04	58.33	59.10	37.30	27.94
Agr'l College	C.	48.29	[c]	19.19	20.40	33.19	44.84	58.76	66.02	74.03	70.00	56.21	57.28	-----	-----
Ionia	C.	-----	[d]	-----	-----	-----	-----	60.51	67.21	75.81	70.34	57.61	55.82	34.61	23.99
Lansing	C.	-----	49.14	25.03[o]	22.49	36.27	47.54[h]	60.88[h]	67.71	75.86	70.65	58.11	59.50	38.22	27.46
Otisville	C.	48.22	46.58	19.53	19.33	32.76	44.92	60.52	66.79	73.85[l]	68.57[l]	56.14[j]	56.69[i]	34.97	24.84[k]
Benton Harbor	S. W.	51.03	[e]	22.23[k]	24.80[g]	34.99[h]	46.87[g]	-----	-----	74.87[j]	72.51[h]	62.69[l]	-----	33.73[m]	29.09[l]
Niles	S. W.	49.70	48.45	19.37	22.74	34.33	48.68	60.73	66.71	74.44	68.95	57.82	59.19	39.60	28.83
Battle Creek	S. C.	51.46	50.17	22.05	23.33	36.37	49.36	62.32	70.43	77.66	72.40	58.98	59.80	40.04	29.25[k]
Coldwater	S. C.	49.97	48.35	21.62[i]	24.40	36.23	47.03	56.39[g]	68.71[k]	74.16	70.95	57.76	58.56	37.27	27.16
Kalamazoo	S. C.	49.19	47.57	19.47	21.38	34.46	45.86	59.68	66.68[k]	74.58	69.78	57.32	57.99	36.84	26.85
Mendon	S. C.	48.60	47.08	17.64[n]	21.93[n]	34.37[n]	46.14[h]	59.47[k]	64.36[k]	74.10[i]	68.36[k]	57.20[j]	57.12[n]	37.11[j]	27.17
Tecumseh	S. C.	49.43	46.59	18.97	22.02	33.94	44.68	59.34	59.18	73.70	69.39	56.81	57.22	36.83	27.04
Ypsilanti	S. C.	50.25	49.39	19.87[p]	22.98	35.74	47.00	62.92	67.26[j]	74.16[l]	71.24[h]	61.55[k]	61.14[k]	40.22[n]	28.54[g]
Detroit	S. E.	49.87	48.42	21.68	23.17	34.53	45.38	59.72	66.30	73.62	70.13	58.73	59.13	39.20	29.45
Woodmere Cemetery.	S. E.	48.61	46.68	19.39	21.54	33.75	44.51	58.58	65.56	72.60	68.05	56.92	53.36	37.37	28.48
Washington	S. E.	-----	46.44	21.18	21.67[n]	33.54	43.37	57.78	64.21	72.47	68.54	56.32	56.34	35.52	26.35

* The names of observers, their places of observation, and the counties in which these places are situated, are stated in Exhibit 7, page 306.

† The names of divisions, and the counties in each, are stated in Exhibit 1, page 227.

‡ This line is an average for only the 19 stations from which statements were received for every month of the year.

In the columns from January to December, inclusive, the letters f, g, h, etc., stand directly under the numbers from which they refer to the notes below.

[a] The average for 15 localities in 1878 is 49.18°. [b] For 11 months, 46.44°. [c] Including the observations at Lansing for Nov. and Dec., the average of this line is 46.88°; the average for the 10 months, Jan. to Oct. inclusive, is 49.99°. [d] For 8 months, 55.74°. [e] For 9 months, 44.64°. [f] For 24 days. [g] For 25 days. [h] For 26 days. [i] For 30 days. [j] For 28 days. [k] For 29 days. [l] For 16 days. [m] For last 15 days. [n] For 27 days. [o] For the last 25 days, and the first days of the month were the coldest. [p] For 20 days.

The lines for 12 representative stations in Table I. are graphically represented in Diagram I., on the opposite page. Comments on the diagrams are printed on pages 307–9.

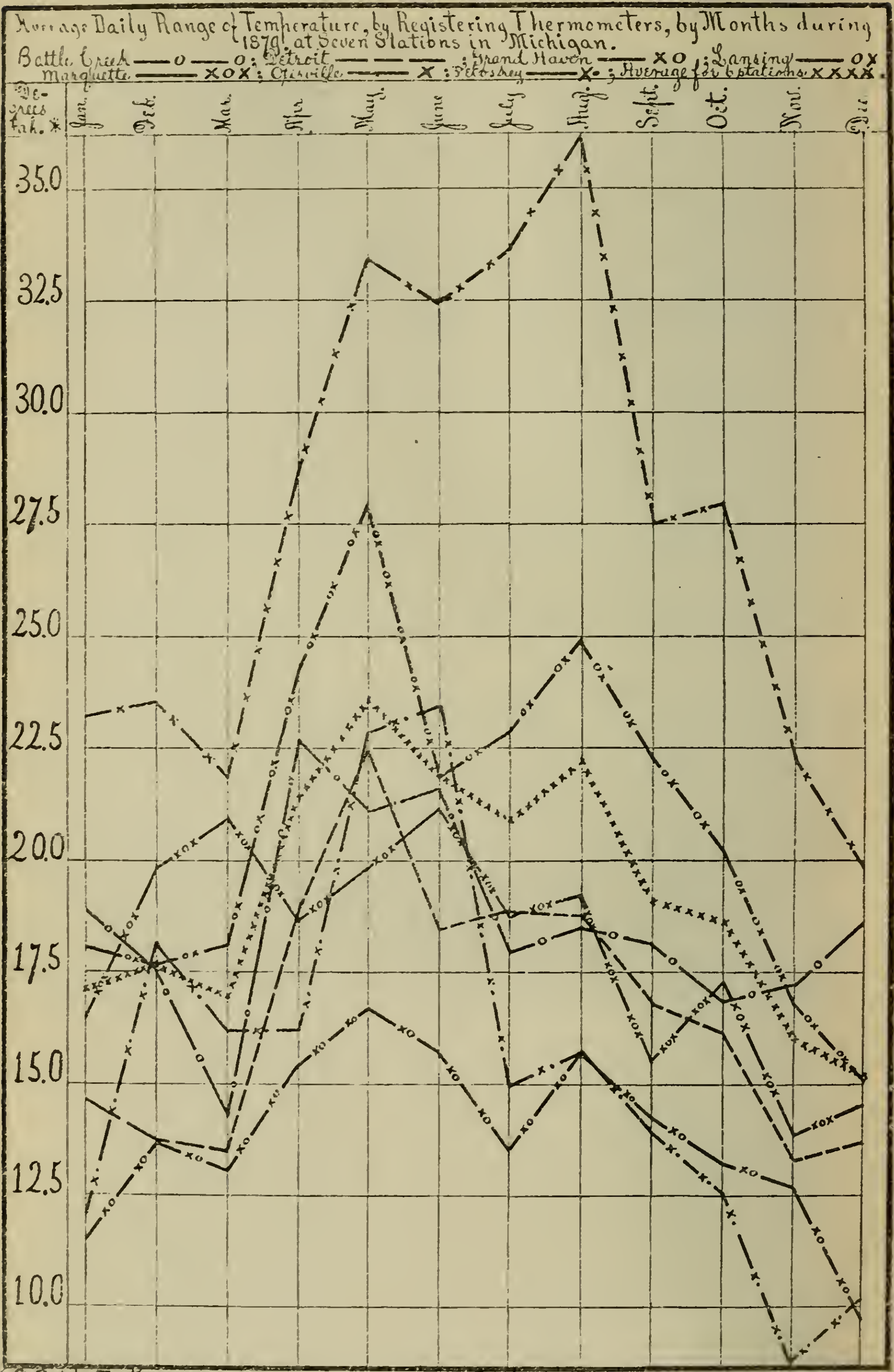
AVERAGE DAILY RANGE OF TEMPERATURE.

Most beginners in sanitary science assume that sudden changes in the temperature are very productive of sickness. After a study of the subject from time to time during more than ten years, the writer has found that the positive evidence of the truth of such an assumption is not easy to get. There is no difficulty in finding evidence that long-continued cold and long-continued heat are followed by increased sickness; this is apparent on comparing Diagram I. in this article with Diagram 1 in the article following—relative to sickness as reported weekly to the State Board of Health,—the group of diarrheal diseases are apparently closely related to long-continued high temperature; the diseases of the air-passages seem to bear a close relation to a low temperature; there are, however, few if any diseases which follow very closely the curve representing the average daily range of temperature; it is worthy of note however that one disease, intermittent fever, which has been thought (by the writer at least) to have a relation to range of temperature, seems to be more than usually prevalent in months when the average daily range of temperature is greater than the average for the year, and to be less than usually prevalent in months when the average daily range of temperature is less than the average for the year. The subject may be most conveniently studied by noticing the line of xxx's, being the average for six stations, in Diagram II., representing the average daily range at seven stations in Michigan, and comparing this line with the uppermost line in Diagram 3, in the article following this, entitled Weekly Reports of Diseases.

It may be well to bear in mind in relation to this subject that intermittent fever is a disease of the warm season in this State, that it becomes more and more prevalent as we go South until in the extreme Southern States it is extremely common and severe, that the daily range of temperature is greatest in the warm months in this State, that it is greater in the warmer climates of the Southern States, that this is especially true on the low lands, and that it is exposure during the day and during the night on the low lands in the South which is believed to be so uniformly productive of chills and fever.

If periodic chills and fever is produced or greatly favored by excessive periodic changes in the temperature of the atmosphere, then the reason is supplied why exposure on the hot low lands during the day and return to the warm high lands at night is not so productive of ague as is exposure to the cold night-air of the low lands.

DIAGRAM No. II.—RANGE OF TEMPERATURE, MONTHS IN 1879.



*SCALE, 5 degrees FAH. to 1.20 inches, vertically.
Designed by Henry B. Baker. Drawn by H. B. Turner and Jno. K. Allen.

EXHIBIT 14.—*Comparison of the Average Daily Range of Temperature for the Year and for each Month of the Year 1879 with Averages for the 9 Years, 1870–78, and for the Year 1878,—as indicated by Observations made at 7 A. M., 2 P. M., and 9 P. M., Daily, by Prof. R. C. Kedzie, at the State Agricultural College*, near Lansing, Michigan.*

YEARS, ETC.	AVERAGE DAILY RANGE OF TEMPERATURE,—DEGREES FAHR.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.*	Dec.*
Av. 9 Years, '70–8	15.55	11.21	15.83	14.93	16.44	16.41	17.16	16.97	17.87	19.46	16.77	13.06	10.54
1878	13.56	8.74	14.55	12.06	14.07	13.08	15.80	14.29	17.71	17.43	15.77	11.57	7.90
1879*	14.90	13.39	11.46	12.74	19.03	18.68	16.60	16.81	19.06	16.13	15.23	10.90	8.71
In 1879 **Greater** than Av. 9 Years, 1870–8	......	2.18	......	......	2.59	2.27	......	......	1.19	......	......	......	......
In 1879 **Less** than Av. 9 Years, 1870–8	.65	......	4.37	2.19	......	......	.56	.16	......	3.33	1.54	2.16	1.83
In 1879 **Greater** than in 1878	1.34	4.65	......	.68	4.96	5.60	.80	2.52	1.35	......	......	......	.81
In 1879 **Less** than in 1878	......	......	3.09	......	......	......	......	......	......	1.30	.54	.67	......

* For November and December, 1879, the observations were made by Harry B. Turner, at the office of the State Board of Health, Lansing.

TABLE II.—*Average Daily Range of Temperature, by Registering Thermometers ‡, during the Year and during each Month of the Year 1879, for Six Stations, and at each of Seven Stations in Michigan.*

STATIONS IN MICHIGAN.*	Division of the State.†	AVERAGE DAILY RANGE OF TEMPERATURE,—DEGREES FAHR.												
		Year 1879.	MONTHS, 1879.											
			Jan.	Feb.	Mar.	Apr.	May.	J'ne.	J'ly.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 6 Stations‡	......	19.22	17.12	17.64	16.95	21.43	23.58	21.87	20.92	22.21	19.06	18.61	16.00	15.23
Marquette	U. P.†	17.99	16.48	19.82	20.94	18.60	19.84	21.17	18.71	19.16	15.47	17.29	13.83	14.52
Petoskey‡	N.	15.40	12.03	18.14	16.19	16.20	22.84	23.47	14.97	15.71	13.90	12.58	8.67	10.13
Grand Haven	W.	13.75	11.52	13.64	13.03	15.43	16.65	15.70	13.52	15.68	14.20	13.23	12.67	9.68
Lansing	C.	20.83	18.04	17.64	18.10	24.22	27.96	21.87	22.87	24.97	22.27	20.16	16.77	15.03
Otisville	C.	27.54	23.19	23.54	21.84	28.70	33.45	32.43	33.63	36.19	27.50	27.97	22.20	19.83
Battle Creek	S. C.	18.61	18.84	17.50	14.29	22.67	21.10	21.60	17.94	18.50	18.13	16.87	17.21	18.63
Detroit	S. E.	16.60	14.65	13.71	13.48	18.93	22.48	18.43	18.84	18.74	16.80	16.13	13.30	13.68

* The names of observers, their places of observation, and the counties in which these places are situated are stated in Exhibit 7, page 306.

† For counties in each division, see Exhibit 1, page 227.

‡ The range of temperature at Petoskey, having been determined from the 7 A. M., 2 P. M., and 9 P. M. observations, has not been included in the average with the other 6 stations, for which the range was determined from registering thermometers.

Graphic representations of statements in Table II. are given in Diagram II., opposite this page.

TABLE III.—*Extremes of Temperature and Days of Month on which the Highest and for the Year 1879, at each of 23 Stations in Michigan,—as indicated by Daily Readings P. M., by Observers* for the State Board of Health, and for the U. S. Signal Service.*

Line Number.	STATIONS IN MICHIGAN.*	YEAR 1879.			JANUARY.		FEBRUARY.		MARCH.		APRIL.		MAY.	
		Highest.	Lowest.	Range.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.
1	At 19 Stations..‡	102°	-22°	124°	50°	-20°	46°	-22°	72°	-12°	87°	5°	95°	22°
2	Marquette*.....§	96	-20	116	$45^{27,30}$	-6^{2}	39^{2}	-20^{27}	63^{9}	$-6^{15,16}$	80^{22}	12^{2}	92^{29}	30^{1}
3	Menominee......	----	----	----	44^{27}	-12^{3}	36^{10}	-20^{27}	58^{10}	-6^{3}	65^{25}	14^{2}	85^{29}	39^{7}
4	Petoskey.......[a]	87	-16	103	46^{27}	3^{20}	40^{18}	-16^{19}	60^{10}	$-2^{16,19}$	$75^{23,25}$	15^{3}	86^{19}	31^{1}
5	Alpena..........§	89	-22	111	48^{27}	-8^{9}	40^{22}	-22^{27}	66^{10}	-8^{17}	70^{27}	5^{2}	$86^{12,30}$	29^{1}
6	Grand Haven...§	86	0	86	43^{27}	0^{2}	45^{10}	2^{14}	$62^{8,9}$	5^{3}	78^{24}	18^{3}	83^{29}	30^{3}
7	Nirvana.........[b]	94	-19	113	46^{27}	-4^{1}	40^{10}	-19^{18}	61^{8}	-12^{3}	87^{24}	17^{2}	91^{13}	$32^{1,6}$
8	Port Huron......§	92	-14	106	42^{27}	-14^{3}	41^{11}	-5^{27}	61^{9}	8^{17}	73^{25}	14^{3}	87^{30}	30^{1}
9	Thornville ......§	96	-11	107	49^{27}	-11^{3}	41^{22}	-3^{27}	65^{10}	14^{16}	80^{26}	16^{3}	90^{13}	$30^{2,8}$
10	Ag'l College.....§	97	-18	115	$44^{26,27}$	-18^{2}	41^{10}	-6^{14}	66^{10}	4^{2}	81^{24}	$12^{1,3}$	91^{13}	25^{7}
11	Ionia............	----	----	----	------	------	------	---------	------	---------	------	-----	$87^{12,13}$	$36^{2,3}$
12	Lansing..........§	95	-20	115	$48^{26,27}$	-20^{3}	43^{8}	$-2^{13,14}$	72^{10}	11^{15}	83^{24}	16^{3}	89^{13}	30^{7}
13	Otisville ....§	102	-13	115	50^{28}	-13^{3}	43^{23}	-12^{27}	66^{11}	4^{3}	82^{25}	14^{3}	95^{14}	25^{8}
14	Benton Harbor..	----	----	----	$44^{27,29}$	$-3^{2,10}$	48^{10}	0^{27}	75^{8}	12^{3}	87^{24}	$23^{2,3}$	------	-----
15	Niles	96	-18	114	44^{25}	-18^{3}	$40^{8,11}$	-10^{27}	69^{10}	-2^{3}	86^{23}	25^{3}	$87^{11,15}$	32^{1}
16	Battle Creek..[c] §	91	-10	101	$46^{26,27}$	-10^{2}	42^{8}	-2^{26}	66^{10}	11^{2}	81^{23}	12^{2}	$84^{13,14}$	31^{7}
17	Coldwater	96	-18	114	45^{27}	-18^{3}	46^{10}	-6^{27}	64^{10}	16^{3}	82^{23}	18^{3}	81^{30}	30^{8}
18	Kalamazoo.......§	93	-14	107	47^{26}	-14^{2}	43^{10}	-5^{26}	69^{8}	12^{15}	83^{23}	14^{2}	$87^{12,29}$	28^{1}
19	Mendon	92	-14	106	42^{27}	$-14^{2,3}$	$41^{8,10}$	-3^{14}	70^{8}	14^{3}	85^{23}	19^{3}	85^{20}	36^{1}
20	Tecumseh.......[d]	92	-13	105	44^{30}	-13^{3}	40^{11}	-4^{27}	$61^{8,10}$	15^{3}	$74^{23,24}$	17^{3}	$84^{13,30}$	34^{2}
21	Ypsilanti	90	-13	103	$45^{27,28}$	-13^{2}	42^{22}	-4^{27}	69^{10}	15^{15}	$75^{25,26}$	22^{3}	90^{31}	34^{7}
22	Detroit ....§	94	-15	109	44^{27}	-15^{3}	42^{22}	$-3^{15,27}$	67^{9}	14^{16}	76^{25}	16^{3}	87^{30}	30^{2}
23	Woodmere Cemetery..........§	95	-15	110	42^{27}	-15^{3}	42^{22}	-5^{27}	65^{9}	12^{16}	76^{24}	16^{3}	$88^{30,31}$	22^{8}
24	Washington	93	-10	103	$43^{27,29}$	-10^{2}	43^{22}	$1^{14,27}$	63^{10}	15^{3}	76^{25}	$21^{2,3}$	87^{12}	31^{1}

NOTE.—The small figures above and at the right of numbers denoting the degrees of temperature state the day or days of the month on which the highest or the lowest temperature occurred. In some cases as great an extreme occurred on other days, stated in foot-notes to the table and referred to by superior letters in the column with the names of stations.

* The names of Observers, etc., are stated in Exhibit 7, page 306.

‡ This line refers only to the 19 stations from which observations were received for every month of the year.

§ Determined by daily readings of registering thermometers made and recorded at 7 A. M. for the preceding calendar day. But at Otisville the observations were recorded for the calendar day on which they were made; and at Woodmere Cemetery the observations on the registering thermometers were made at 9 P. M. and recorded for the day on which they were made; and at the stations of the U. S. Signal Service the registering thermometers were recorded and set each day at 11 P. M. Washington time. For stations not indicated by this mark (§), the extremes were determined from the 7 A. M., 2 P. M., and 9 P. M. observations.

[a] At Petoskey maximum temperature of the month also on April 26.

[b] At Nirvana the thermometer was as low as 16° May 1.

[c] At Battle Creek max. also June 24 and 26.

[d] At Tecumseh max. also May 31.

the Lowest Temperatures occurred, by Months of the Year 1879; also Extremes and Range of Registering Thermometers or by Observations made Daily at 7 A. M., 2 P. M., and 9

JUNE.		JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		Line Number.
Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	
98°	30°	100°	41°	102°	35°	100°	25°	94°	20°	81°	0°	61°	-9°	1
95^{23}	32^{2}	93^{31}	46^{24}	96^{30}	37^{16}	77^{30}	35^{24}	87^{15}	22^{31}	59^{7}	8^{20}	44^{5}	$-9^{18,26}$	2
86^{23}	46^{1}	92^{14}	$62^{23,24}$	87^{29}	52^{25}	80^{29}	40^{24}	$79^{6,15}$	24^{31}	55^{8}	8^{21}	------	------	3
78^{15}	36^{2}	87^{3}	50^{10}	84^{2}	50^{25}	78^{11}	35^{24}	$85^{6,16}$	28^{24}	65^{8}	11^{20}	50^{6}	-5^{30}	4
87^{9}	34^{7}	$88^{13,15}$	48^{19}	89^{2}	42^{17}	85^{30}	30^{25}	83^{10}	24^{31}	62^{8}	0^{30}	55^{10}	-5^{26}	5
86^{24}	40^{7}	86^{15}	54^{18}	83^{2}	46^{18}	76^{1}	30^{25}	80^{11}	$31^{24,25}$	$67^{8,9}$	14^{20}	$58^{5,6}$	6^{26}	6
91^{24}	43^{6}	$94^{14,21}$	55^{18}	$92^{1,30}$	40^{9}	80^{1}	25^{25}	$85^{6,7}$	21^{25}	63^{11}	7^{24}	48^{5}	-7^{19}	7
90^{25}	39^{7}	92^{15}	53^{5}	$91^{2,29}$	46^{10}	80^{1}	31^{25}	86^{6}	24^{31}	$65^{8,11}$	10^{21}	$56^{6,10}$	-2^{26}	8
94^{25}	38^{7}	96^{15}	$52^{18,19}$	96^{31}	$46^{9,17}$	86^{1}	30^{25}	86^{2}	26^{25}	$67^{8,11}$	12^{21}	55^{5}	0^{26}	9
$95^{24,25}$	33^{6}	97^{14}	47^{17}	96^{31}	34^{16}	85^{1}	$27^{24,25}$	87^{6}	15^{31}	--------	--------	------	------	10
93^{24}	46^{1}	97^{15}	$62^{17,19}$	96^{21}	48^{18}	95^{1}	33^{25}	87^{7}	22^{25}	69^{11}	$10^{3,23}$	55^{6}	3^{26}	11
93^{25}	40^{6}	95^{15}	54^{17}	$95^{30,31}$	41^{16}	$83^{1,30}$	30^{24}	89^{6}	22^{31}	75^{13}	13^{20}	58^{9}	-3^{25}	12
98^{26}	30^{7}	100^{15}	41^{25}	102^{1}	$35^{17,18}$	100^{1}	25^{25}	$94^{7,12}$	20^{25}	70^{12}	3^{4}	61^{11}	-3^{27}	13
------	--------	$93^{14,21}$	$62^{4,18,29}$	94^{21}	55^{9}	86^{30}	35^{25}	------	------	--------	--------	57^{5}	4^{26}	14
90^{24}	40^{6}	96^{10}	60^{18}	$90^{21,31}$	51^{26}	83^{30}	32^{26}	88^{11}	26^{25}	81^{13}	10^{3}	59^{2}	-1^{25}	15
$89^{9,22}$	$43^{3,6}$	91^{15}	$55^{17,29}$	90^{30}	42^{17}	89^{1}	$31^{21,25}$	86^{12}	28^{31}	69^{11}	$12^{21,23}$	$58^{9,10}$	-1^{25}	16
90^{24}	$48^{2,3}$	92^{15}	$62^{4,19}$	96^{31}	52^{18}	76^{30}	$45^{14,19}$	84^{12}	29^{31}	66^{11}	$16^{3,20,21}$	52^{6}	3^{25}	17
90^{24}	41^{6}	93^{15}	55^{18}	92^{31}	45^{16}	79^{30}	31^{24}	85^{11}	24^{31}	$69^{11,13}$	$13^{2,3}$	58^{9}	-2^{25}	18
87^{25}	46^{7}	92^{15}	61^{18}	92^{31}	$52^{17,18}$	77^{30}	35^{25}	87^{12}	28^{25}	$69^{11,13}$	8^{3}	52^{5}	0^{25}	19
$87^{24,26}$	$40^{16,18,22}$	92^{15}	$60^{18,19,20}$	$88^{30,31}$	$50^{17,18}$	80^{1}	33^{25}	83^{6}	27^{26}	68^{13}	$13^{21,24}$	53^{10}	$3^{18,26}$	20
83^{27}	53^{1}	$88^{14,15}$	$66^{24,30}$	$88^{2,30,31}$	$57^{18,26}$	80^{1}	46^{25}	$85^{6,12}$	30^{24}	71^{8}	14^{21}	56^{10}	0^{26}	21
91^{25}	39^{7}	94^{15}	$54^{5,19}$	93^{30}	48^{17}	$82^{1,30}$	40^{19}	$85^{6,7}$	$26^{25,31}$	$69^{8,11}$	12^{21}	59^{5}	-2^{26}	22
92^{25}	37^{7}	94^{15}	$49^{1,5}$	95^{30}	44^{17}	83^{1}	$28^{25,26}$	$86^{1,6,7}$	21^{25}	72^{11}	9^{21}	$59^{5,6}$	-3^{26}	23
90^{25}	40^{6}	$91^{14,15}$	$57^{4,17}$	$93^{30,31}$	52^{16}	85^{1}	33^{24}	86^{6}	$25^{26,31}$	$67^{8,11,12}$	8^{24}	55^{5}	3^{26}	24

EXHIBIT 15.—*Comparison of the Extremes and the Range of Temperature (Degrees Fahr.) during the Year and during each Month of the Year 1879, with the Average of the Extremes and of the Range for the Six Years, 1873–8, and also with the Extremes and Range for the Year and for each Month of the Year 1878; also, Statement of the Extremes and of the Range for each of the Six Years, 1873–8. Observations made with Registering Thermometers (except for the first two Months of 1873, and for those two Months with an Ordinary Thermometer at 7 A. M., 2 P. M., and 9 P. M.) Daily, by Prof. R. C. Kedzie, at the State Agricultural College,* near Lansing, Michigan.*

EXTREMES AND RANGES OF TEMPERATURE,—DEGREES F.

YEAR AND MONTHS.	1873.			1874.			1875.			1876.			1877.			1878.			AV. FOR 6 YRS., 1873-8.†			1879. *			IN 1879 HIGHER (+), OR LOWER (-), THAN AV. FOR 6 YRS, 1873-8.			IN 1879 HIGHER, (+), OR LOWER (-), THAN IN 1878.		
	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.
YEAR	94	-30	124	101	-7	108	94	-33	127	96	-19	115	93	-14	107	98	-7	105	96	-18	114	97	-18	115	+1	0	+1	-1	-11	+10
Av. Month..	74	15	59	77	15	62	75	10	64	74	19	56	74	20	54	73	22	51	74	17	58	76	15	61	+2	-2	+3	+3	-7	+10
January.....	43	-30	73	59	-7	66	35	-13	48	65	6	59	52	-9	61	43	-4	52	50	-10	60	44	-18	62	-6	-8	+2	-4	-14	+10
February....	49	-13	62	48	-1	49	42	-33	75	59	-1	60	56	10	46	55	-7	62	52	-8	59	41	-6	47	-11	+2	-12	-14	+1	-15
March.......	57	-12	69	67	8	59	75	-11	86	60	0	60	51	-14	65	72	18	54	64	-2	66	66	4	62	+2	+6	-4	-6	+14	+8
April.........	82	24	58	68	3	65	80	0	80	74	16	58	81	18	63	75	29	46	77	15	62	81	12	69	+4	-3	+7	+6	+17	+23
May	84	27	57	96	21	75	89	24	65	89	31	58	90	26	64	77	29	48	88	26	61	91	25	66	+3	-1	+5	+14	+4	+18
June	94	42	52	95	34	61	89	33	56	95	42	53	89	40	49	94	39	55	93	38	54	95	33	62	+2	-5	+8	+1	+6	+7
July.........	92	44	48	98	43	55	92	44	48	96	46	50	91	43	48	98	47	51	95	45	50	97	47	50	+2	+2	0	-1	0	-1
August......	94	44	50	101	41	60	93	35	58	96	36	60	93	43	50	93	42	51	95	40	55	96	34	62	+1	-6	+7	+3	-8	+11
September..	89	26	63	95	30	65	94	26	68	80	36	44	85	38	47	92	31	61	89	31	58	85	27	58	-4	-4	0	-7	-4	-3
October.....	79	16	63	76	16	60	77	18	59	75	19	56	87	26	61	82	21	61	79	19	60	87	15	72	+8	-4	+12	+5	-6	+11
November .*	56	1	55	70	3	67	60	2	58	62	12	50	55	4	51	52	15	37	59	6	53	75	13	62	+16	+7	+9	+23	-2	+25
December .*	61	10	54	50	-6	56	70	-1	71	41	-19	60	58	13	45	36	-2	38	53	-1	54	58	-3	61	+5	-2	+7	+22	-1	+23

* For November and December, 1879, the observations were made by Harry B. Turner, at the office of the State Board of Health, Lansing.

† For the six years: highest, 101°, August 11, 1874; lowest, -33°, February 8, 1875; range, 134°.

HUMIDITY OF THE ATMOSPHERE.

That variations in the absolute humidity of the atmosphere correspond very closely with variations in temperature may be seen by a comparison of Diagram III., page 327, with Diagram I., page 316. By comparing Exhibit 16, below, with Exhibit 13, page 314, it would seem that in 1879 the humidity of the air was greater than in 1878 in every month in which the average temperature was higher; and less in every month in which the temperature was lower.

The relative humidity was greater at the College than at the office of the State Board of Health in every month. This may be in part due to difference in places of observation of temperature mentioned on page 312, the instruments at the office of the Board being placed on the south side of the State Capital.

EXHIBIT 16.—*Comparison by Year and Months of the Average Absolute Humidity (Grains of Vapor in a Cubic Foot of Air) at 16 Stations in 1879, with the Average at 12 Stations in 1878.**

YEARS, ETC.	GRAINS OF VAPOR IN A CUBIC FOOT OF AIR,—(ABSOLUTE HUMIDITY.)												
	Annual Av.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 12 Stations in 1878	3.81	1.73	1.83	2.79	3.68	3.88	5.26	7.14	6.37	5.44	3.62	2.47	1.54
Av. for 16 Stations in 1879	3.43	1.31	1.23	1.93	2.64	3.94	5.09	6.30	5.58	4.40	4.61	2.46	1.70
In 1879 **Greater** than in 1878	------	------	------	------	------	.06	------	------	------	------	.99	------	.16
In 1879 **Less** than in 1878	.38	.42	.63	.86	1.04	------	.17	.84	.79	1.04	------	.01	------

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* Ten of the stations, namely, Nirvana, Otisville, Thornville, Niles, Battle Creek, Kalamazoo, Mendon, Tecumseh, Detroit, and Woodmere Cemetery, were the same for both years; two, Benton Harbor and Coldwater, were included in the average for 1878 but not in that for 1879; and six, Marquette, Petoskey, Alpena, Grand Haven, Port Huron, and Lansing, were included in the average for 1879, but not in that for 1878.

TABLE IV.—*The Average Number of Grains of Vapor of Water in a Cubic Foot of Air (Absolute Humidity), for Months and Year 1879, at 22 Stations in Michigan,—Average of Observations made Daily at 7 A. M., 2 P. M., and 9 P. M., by Observers* for the State Board of Health, and for the U. S. Signal Service.*

STATIONS IN MICHIGAN.*	GEOGRAPHICAL DIVISIONS OF THE STATE.†	GRAINS OF VAPOR IN A CUBIC FOOT OF AIR.													
		YEAR.		MONTHS, 1879.											
		1878.	1879.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 16 Stations‡	---------	[a]	3.43	1.31	1.23	1.93	2.64	3.94	5.09	6.30	5.58	4.40	4.61	2.46	1.70
Marquette........*	U. P.†	-----	2.90	1.08	0.94	1.47	2.15	3.23	4.46	5.51	5.03	3.88	3.90	1.94	1.18
Menominee........	U. P.	-----	[b]	------	-----	-----	-----	3.71	4.95	6.30	5.58	4.23	4.26	[h]1.92	-----
Petoskey..........	N.	-----	3.40	1.58	1.25	2.02	2.45	3.50	4.42	5.26	6.08	5.21	4.74	2.54	1.70
Alpena............	N. E.	-----	2.93	1.02	0.84	1.28	1.98	3.15	4.39	5.76	5.19	4.04	4.10	2.10	1.34
Grand Haven......	W.	-----	3.48	1.33	1.22	2.00	2.57	3.97	4.91	6.40	5.77	4.41	4.78	2.65	1.78
Nirvana...........	W.	3.40	3.13	1.24	1.00	1.61	[i]2.23	3.69	4.84	5.91	5.08	4.02	4.38	2.10	1.42
Port Huron........	B. & E.	-----	3.23	1.15	1.15	1.82	2.39	3.47	4.79	6.02	5.30	4.18	4.38	2.39	1.74
Thornville	B. & E.	3.87	3.76	1.51	1.44	2.15	2.80	4.38	5.67	6.85	5.69	4.68	5.09	2.82	2.02
Ionia..............	C.	-----	[c]	------	-----	-----	-----	4.17	5.25	6.43	5.41	4.46	4.54	-----	-----
Lansing...........	C.	-----	3.44	[j]1.48	1.40	2.07	[k]2.75	[l]4.19	5.18	6.10	5.26	4.19	4.58	2.45	1.65
Otisville..........	C.	3.76	3.59	1.45	1.36	2.00	2.73	3.99	5.16	6.37	6.00	4.75	4.88	2.53	1.85
Benton Harbor....	S. W.	4.80	[d]	[m]1.82	1.99	2.87	[n]4.08	-----	------	8.84	8.28	[o]6.20	-----	[p]2.59	2.26
Niles.............	S. W.	4.02	3.88	1.21	1.27	2.20	3.61	4.96	6.02	7.20	6.08	4.60	4.88	2.77	1.81
Battle Creek......	S. C.	3.67	3.67	1.49	1.41	2.19	3.23	4.22	5.46	6.85	5.73	4.39	4.77	2.48	[q]1.76
Coldwater.........	S. C.	3.94	[e]	------	1.02	2.04	2.81	3.68	[r] 6.47	[s]8.09	5.84	4.20	[m]4.60	-----	1.62
Kalamazoo.........	S. C.	3.62	3.44	1.32	1.23	1.95	2.55	3.99	5.17	6.37	5.37	4.27	4.70	2.50	1.81
Mendon............	S. C.	3.78	3.60	[t] 1.44	1.46	[t]2.04	2.79	4.23	5.48	6.62	5.54	4.44	4.73	2.59	1.85
Tecumseh	S. C.	3.87	3.47	1.29	1.36	2.12	2.82	4.06	4.65	6.58	5.68	4.44	4.57	2.44	1.61
Ypsilanti...	S. C.	-----	[f]	------	-----	-----	-----	[u]4.65	5.74	6.36	[v]5.76	4.61	4.64	2.38	[i] 1.73
Detroit............	S. E.	3.34	3.48	1.24	1.15	1.98	2.60	3.94	5.23	6.32	5.68	4.42	4.71	2.59	1.88
Woodmere Cemetery, near Detroit	S. E.	3.68	3.51	1.18	1.19	1.93	2.61	4.02	5.53	6.61	5.73	4.44	4.63	2.47	1.80
Washington.......	S. E.	-----	[g]	------	-----	-----	2.60	3.82	5.21	6.31	5.17	4.23	4.60	2.41	1.78

* The names of observers, their places of observation, and the counties in which these places are situated, are stated in Exhibit 7, page 306.

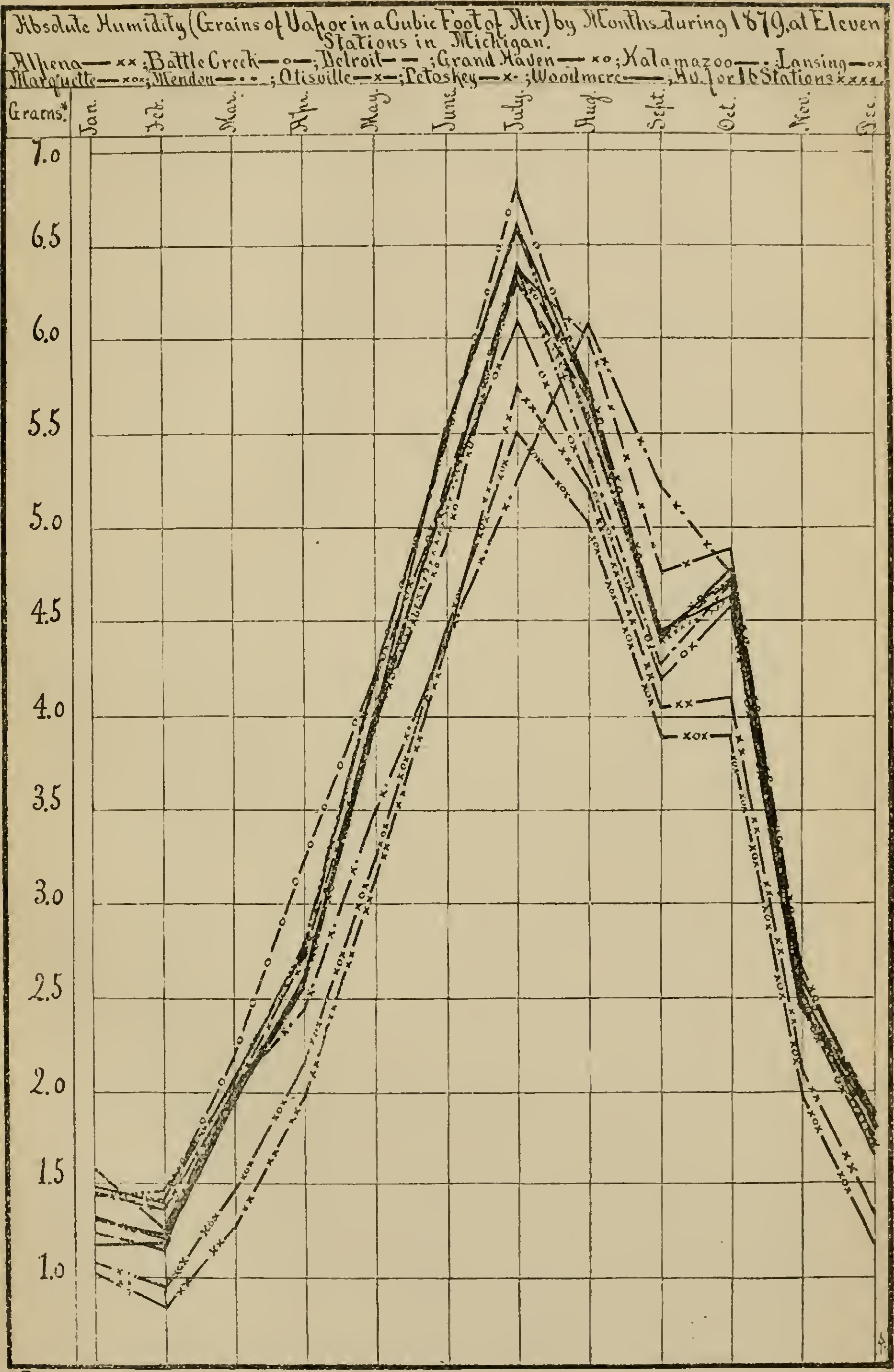
† The full names of the divisions and the counties in each division, are stated in Exhibit 1, page 227.

‡ This line is an average for only the stations for which statements are given for every month of the year.

[a] The average for 12 stations in 1878 is 3.81 grs. [b] For 7 months, 4.42. [c] For 6 months, 5.04. [d] For 9 months, 4.33. [e] For 10 months, 4.04. [f] For 8 months, 4.48. [g] For 9 months, 4.01. [h] For about 80 observations. [i] For 22 days. [j] For the last 25 days. [k] For 84 observations. [l] For 85 observations. [m] For 86 observations. [n] For 81 observations. [o] For 70 observations. [p] For last 15 days. [q] For 29 days. [r] For 69 observations. [s] For 77 observations. [t] For 87 observations. [u] For 30 days. [v] For 83 observations.

The lines for 11 representative stations in Table IV., are graphically represented in Diagram III., opposite this page. Comments are printed on pages 307–308.

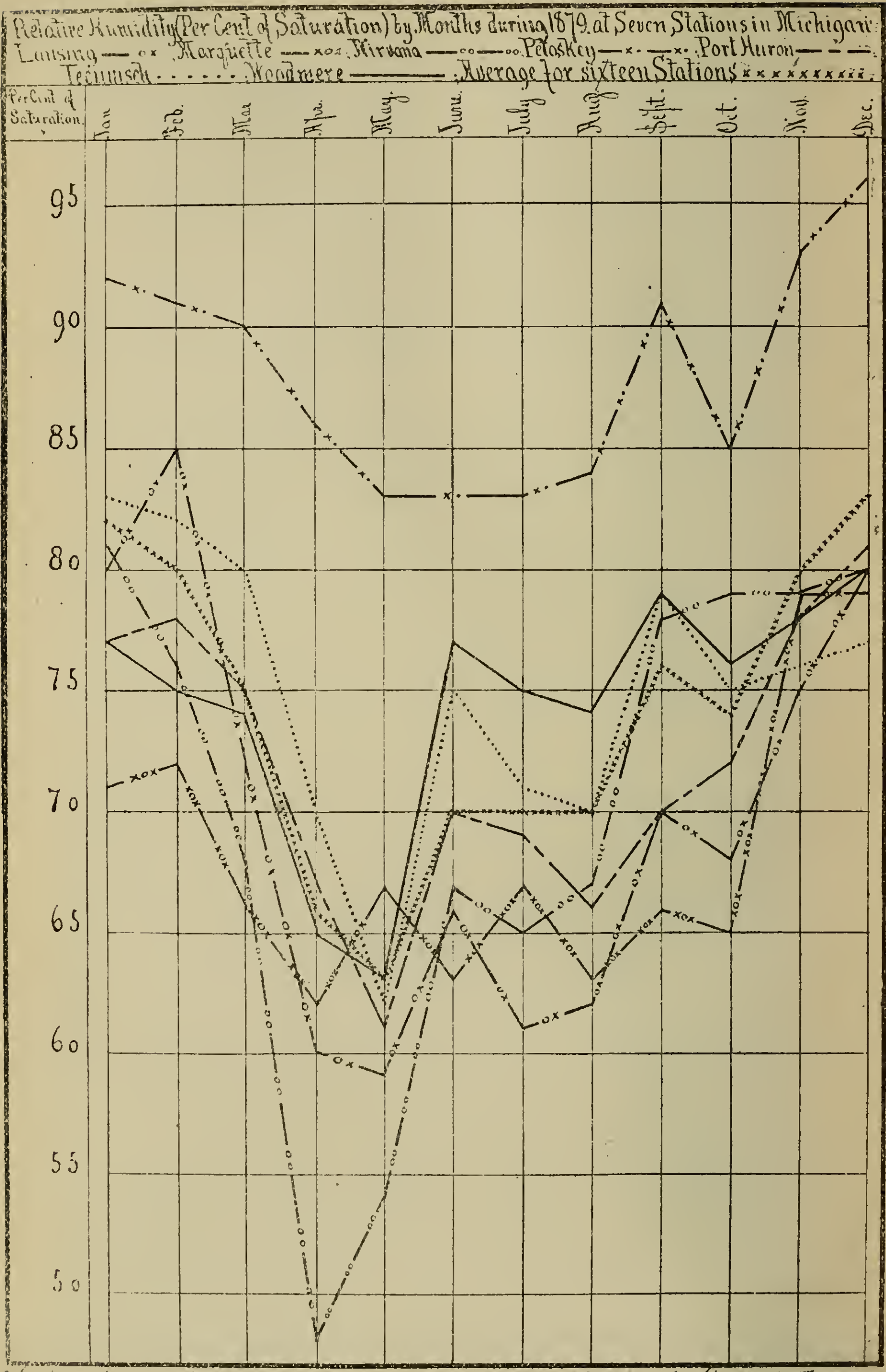
DIAGRAM NO. III.—ABSOLUTE HUMIDITY, BY MONTHS, IN 1879.



*Scale, one grain of vapor (in a cubic foot of air) to an inch, vertically.

Drawn by H. B. Turner, and Jno K. Allen *Designed by Henry B. Baker.*

DIAGRAM No. IV.--RELATIVE HUMIDITY, BY MONTHS IN 1879.



Scale, 10 per cent of saturation to 1.3 inches, vertically. Designed by Henry B. Baker.
Drawn by H. B. Turner and Jno K. Allen.

TABLE V.—*Average Per Cent of Saturation of the Atmosphere with Vapor of Water (Relative Humidity) during the Year and during each Month of the Year 1879, at 23 Stations in Michigan,—Average of Observations made Daily at 7 A. M., 2 P. M., and 9 P. M., by Observers* for the State Board of Health, and for the U. S. Signal Service.*

STATIONS IN MICHIGAN.*	Geographical Divisions of the State.†	PER CENT OF SATURATION,—RELATIVE HUMIDITY.													
		YEAR.		MONTHS, 1879.											
		1878.	1879.	Jan.	Feb.	Mar.	Apr.	May.	J'ne	J'ly.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 16 Stations‡	----------	[a]	74	82	80	75	66	63	70	70	70	76	74	80	83
Marquette........*	U. P.†	-----	68	71	72	66	62	67	63	67	63	66	65	79	79
Menominee........	U. P.	-----	[b]	-----	-----	-----	-----	63	63	66	66	69	68	[i] 70	-----
Petoskey..........	N.	-----	88	92	91	90	86	83	83	83	84	91	85	93	96
Alpena.............	N. E.	-----	72	71	71	68	64	59	68	70	76	73	75	82	81
Grand Haven......	W.	-----	72	74	75	72	64	63	66	70	70	74	77	81	81
Nirvana............	W.	74	70	81	76	68	[j] 48	54	67	65	67	78	79	79	80
Port Huron........	B. & E.	-----	72	77	78	75	67	61	70	69	66	70	72	78	81
Thornville.........	B. & E.	81	79	92	91	82	68	66	74	71	67	80	80	88	93
Ag. College........	C.	78	[c]	89	92	78	66	64	75	71	70	78	76	-----	-----
Ionia..............	C.	-----	[d]	-----	-----	-----	-----	63	69	65	62	75	77	-----	-----
Lansing...........	C.	-----	70	[k] 80	85	72	[l] 60	[m] 59	66	61	62	70	68	75	80
Otisville...........	C.	81	78	92	89	78	67	59	70	71	77	82	71	86	94
Benton Harbor....	S. W.	-----	[e]	[n] 99	100	100	[o] 97	-----	-----	94	94	[p] 98	-----	[q] 98	100
Niles..............	S. W.	79	77	73	76	80	78	75	79	78	76	79	73	82	71
Battle Creek......	S. C.	69	70	88	82	73	68	59	61	66	61	68	69	67	[r] 78
Coldwater.........	S. C.	78	[f]	-----	60	68	61	57	[s] 82	[t] 85	69	71	[n] 68	-----	79
Kalamazoo...... ..	S. C.	75	72	84	79	71	59	60	67	66	63	73	75	80	88
Mendon	S. C.	78	78	[u] 93	88	[u] 76	66	66	73	72	70	79	76	84	87
Tecumseh	S. C.	80	75	83	82	80	70	62	75	71	70	79	75	76	77
Ypsilanti..........	S. C.	-----	[g]	-----	-----	-----	-----	[v] 64	74	68	[w] 65	69	64	66	[i] 77
Detroit	S. E.	71	70	76	71	71	61	59	68	68	67	72	73	77	82
Woodmere Cemetery.	S. E.	77	74	77	75	74	65	63	77	75	74	79	76	78	80
Washington	S. E.	-----	[h]	-----	-----	-----	67	63	75	70	66	78	76	82	86

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* The names of observers, their places of observation, and the counties in which these places are situated, are stated in Exhibit 7, page 306.

† The full names of the divisions and the counties in each division, are stated in Exhibit 1, page 227.

‡ This line is an average for only the stations for which statements are given for every month of the year.

[a] The average for 12 stations in 1878 is 78. [b] For 7 months, 66. [c] Including the observations at Lansing for Nov. and Dec., the average of this line is 76. [d] For 6 months, 69. [e] For 9 months, 98. [f] For 10 months, 70. [g] For 8 months, 68. [h] For 9 months, 74. [i] For about 80 observations. [j] For 22 days. [k] For the last 25 days. [l] For 84 observations. [m] For 85 observations. [n] For 86 observations. [o] For 81 observations. [p] For 70 observations. [q] For last 15 days. [r] For 29 days. [s] For 69 observations. [t] For 77 observations. [u] For 87 observations. [v] For 30 days. [w] For 83 observations.

Graphic representations of 7 representative lines in this table are given in Diagram IV., opposite this page.

EXHIBIT 17.—*Comparison of the Average Relative Humidity of the Air (Per Cent of Saturation) for the Year and for each Month of the Year 1879, with Averages for the 15 Years, 1864–78, and for 1878.—Observations made at 7 A. M., 2 P. M., and 9 P. M., Daily, by Prof. R. C. Kedzie, at the State Agricultural College*, near Lansing, Michigan.*

YEARS, ETC.	PER CENT OF SATURATION.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.*	Dec.*
Average 15 Y'rs, 1864–78	79	86	86	85	71	69	76	76	77	81	79	83	86
1878	78	89	89	83	69	61	73	68	74	78	76	87	95
1879*	76	89	92	78	66	64	75	71	70	78	76	75	80
In 1879 **Greater** than Av. 15 Years, 1864–78	------	3	6	------	------	------	------	------	------	------	------	------	------
In 1879 **Less** than Av. 15 Years, 1864–78	3	------	------	7	5	5	1	5	7	3	3	8	6
In 1879 **Greater** than in 1878	------	------	3	------	------	3	2	3	------	------	------	------	------
In 1879 **Less** than in 1878	2	------	------	5	3	------	------	------	4	------	------	12	15

* For November and December, 1879, the observations were made by Harry B. Turner, at the office of the State Board of Health, Lansing.

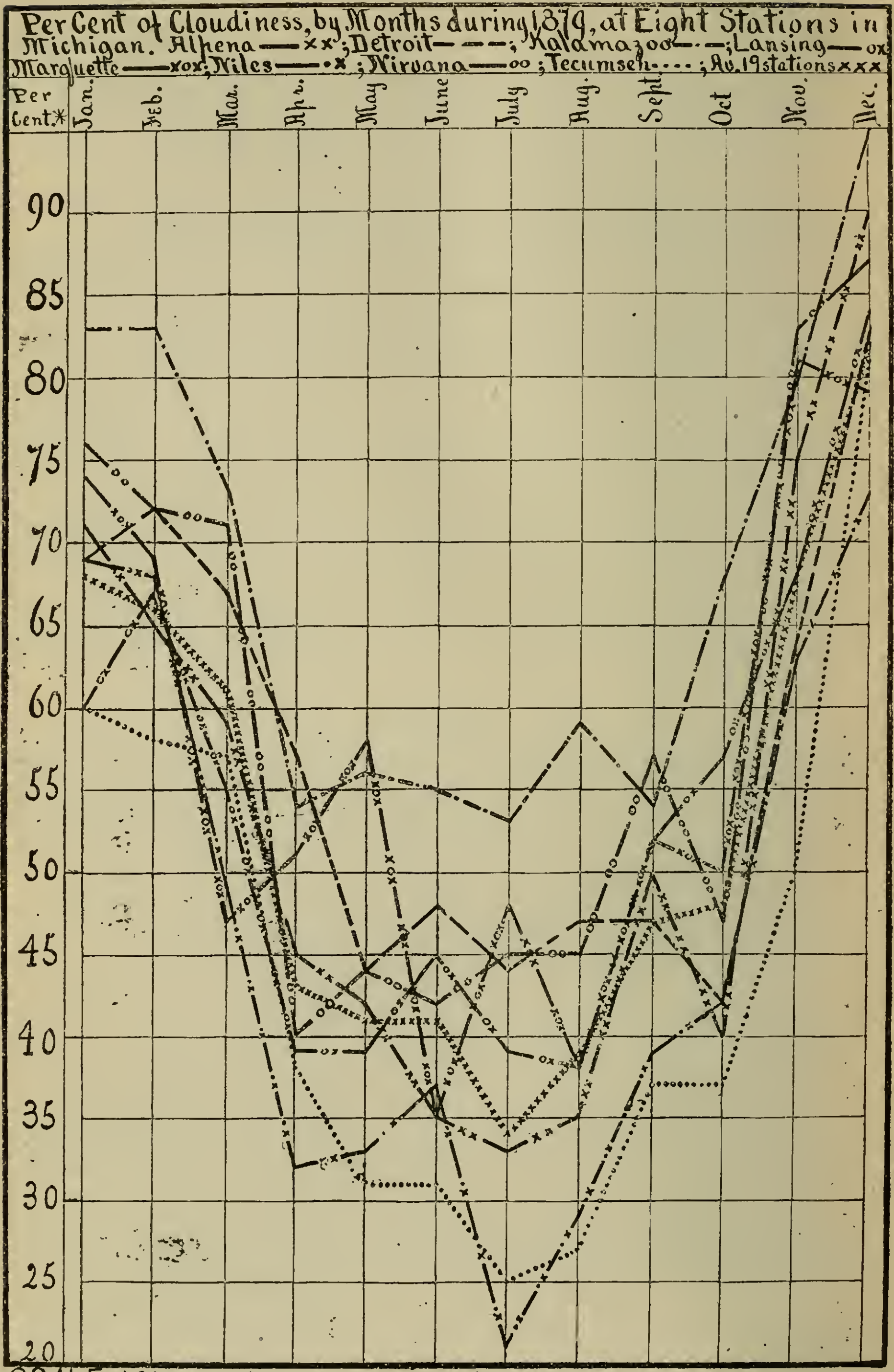
CLOUDINESS.

EXHIBIT 18.—*Comparison of the Average Per Cent of Cloudiness in the Year and in each Month of the Year 1879, with Averages for the 15 Years 1864–78, and for the Year 1878. Observations made at 7 A. M., 2 P. M., and 9 P. M., Daily, by Prof. R. C. Kedzie, at the State Agricultural College,* near Lansing, Michigan.*

YEARS, ETC.	PER CENT OF CLOUDINESS.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.*	Dec.*
Av. 15 Years, 1864–78	59	74	63	65	58	52	50	47	48	50	59	68	76
1878	58	76	56	72	59	54	45	37	40	45	54	68	89
1879*	54	68	73	56	44	40	43	36	35	47	55	68	84
In 1879 **Greater** than Av. 15 Years, 1864–78	------	----	10	------	----	------	------	------	------	------	----	0	8
In 1879 **Less** than Av. 15 Years, 1864–78	5	6	----	9	14	12	7	11	13	3	4	0	------
In 1879 **Greater** than in 1878	------	----	17	------	----	---- -	------	------	------	2	1	0	------
In 1879 **Less** than in 1878	4	8	----	16	15	14	2	1	5	------	----	0	5

* For November and December, 1879, the observations were made by Harry B. Turner, at the office of the State Board of Health, Lansing.

DIAGRAM No. V.—CLOUDINESS BY MONTHS IN 1879.



*SCALE, 10 per cent of cloudiness to .88 of an inch, vertically.

Designed by Henry B. Baker. Drawn by H. B. Turner and Jno K. Allen.

TABLE VI.—*Average Per Cent of Cloudiness, for the Year and for each Month of the Year 1879, at 23 Stations in Michigan,—Average of Observations made Daily at 7 A. M., 2 P. M., and 9 P. M., by Observers for the State Board of Health*, and for the U. S. Signal Service.*

STATIONS IN MICHIGAN.*	Geographical Divisions of the State.†	AVERAGE PER CENT OF CLOUDINESS.													
		YEAR.		MONTHS, 1879.											
		1878.	1879.	Jan.	Feb.	Mar.	Apr.	May.	J'ne.	J'ly.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 23 Stations‡	----------	[a]	53	68	66	61	43	41	41	34	39	47	48	68	82
Marquette........*	U. P.†	-----	57	74	69	47	51	58	35	48	38	52	50	81	79
Menominee........	U. P.	-----	[b]	43	49	53	37	51	33	39	41	51	44	62	-----
Petoskey...........	N.	55	52	69	46	63	37	35	38	31	25	58	51	90	81
Alpena	N. E.	-----	53	71	65	59	45	42	35	33	35	50	40	75	90
Grand Haven......	W.	-----	54	77	73	61	34	42	40	25	37	51	51	77	82
Nirvana.............	W.	59	59	76	72	71	40	44	42	45	45	57	47	83	87
Port Huron........	B. & E.	-----	58	73	69	63	57	49	48	45	49	50	47	64	85
Thornville	B. & E.	55	52	64	69	57	48	36	45	34	37	43	44	64	81
Agrl. College......	C.	58	[c]	68	73	56	44	40	43	36	35	47	55	-----	-----
Ionia	C.	-----	[d]	-----	-----	-----	-----	33	43	45	50	53	52	65	77
Lansing	C.	-----	54	[f] 60	67	55	39	[g] 39	45	39	38	52	57	68	84
Otisville...........	C.	60	51	58	64	58	45	39	46	35	44	49	41	61	77
Benton Harbor....	S. W.	50	[e]	72	68	57	32	-----	-----	21	22	56	-----	73	84
Niles...............	S. W.	48	46	69	68	49	32	33	37	21	29	39	42	63	73
Battle Creek......	S. C.	51	50	78	72	64	39	37	37	27	26	39	45	64	[h] 77
Coldwater.........	S. C.	45	50	63	61	[i] 64	23	[h] 45	42	27	36	43	53	60	86
Kalamazoo.........	S. C.	67	68	83	83	73	54	56	55	53	59	54	68	80	95
Mendon	S. C.	52	50	[j] 58	62	[g] 57	37	39	40	32	36	39	55	71	78
Tecumseh..........	S. C.	50	44	60	58	57	38	31	31	25	27	37	37	50	81
Ypsilanti	S. C.	-----	53	[k] 68	62	66	50	36	42	28	43	44	53	64	[l] 83
Detroit	S. E.	-----	57	69	72	67	57	44	48	44	47	47	42	64	83
Woodmere Cemetery.	S. E.	51	49	57	66	61	47	36	38	28	41	39	41	55	75
Washington	S. E.	-----	52	65	[m] 65	65	50	42	42	29	42	43	39	61	79

* The names of observers, their places of observation, and the counties in which these places are situated, are stated in Exhibit 7, page 306. The average per cent of cloudiness as observed at the Agricultural College, was greater than at the office of the State Board of Health from January to May inclusive, and less the remaining months of the year. Inasmuch as the estimation of the per cent of cloudiness may be differently made by different persons, it may be best to state that about June 1 there was a change of observers at the office of the State Board of Health.

† The full names of divisions and the counties in each division are stated in Exhibit 1, page 227.

‡ This line is an average for only the stations from which statements were received for every month of the year.

[a] The average for 13 stations in 1878 is 54 per cent. [b] For 11 months, 46. [c] Including the observations at Lansing for Nov. and Dec., the average of this line is 54 per cent. [d] For 8 months, 52 [e] For 9 months, 54. [f] For the last 25 days. [g] For 86 observations. [h] For last 29 days. [i] For first 17 days. [j] For 87 observations. [k] For 30 days. [l] For 28 days. [m] For 27 days.

Graphic representations of 8 representative lines in this table are given in Diagram V., opposite this page.

EXHIBIT A.—*Number of Days on which Fog was Recorded in 1879, and in each Month in 1879; and Dates and Hours of Observation when Fogs were Recorded, at Stations Named.*

STATIONS IN MICHIGAN.*	No. of Days, in 1879.	JANUARY.		FEBRUARY.		MARCH.		APRIL.	
		No. of Days and Day of Month.	Hour of Observation.	No. of Days and Day of Month.	Hour of Observation.	No. of Days and Day of Month.	Hour of Observation.	No. of Days and Day of Month.	Hour of Observation.
NUMBER OF DAYS, IN THE STATE..	....	6		3		1		6	
Menominee *	2								
Alpena	9							25 28	9 P. M. 7 A. M. & 2 P. M.
Grand Haven	3	27	7 A. M.						
Nirvana	10					29	7 A. M.	25 26	6 P. M. to 6 A. M.
Port Huron	8	12 27	7 A. M. 9 P. M.						
Thornville	8	12 27	8 to 9 A. M. P. M. till sunset.						
Ionia	59							16, 18, 22, & 28	Morn.
Lansing	12	27	2 P. M.						
Otisville	9								
Niles	1								
Battle Creek	1								
Coldwater	1								
Mendon	3							16	Morn.
Tecumseh	1	27	P. M.						
Detroit	17			8	7 A. M.				
Washington	10	27	9 P. M.						
Woodmere Cemetery	34	11 13 14 and 30 27	Eve. Morn & Eve. Morn. 9 P. M.	7 and 8 10	Morn. Morn.			26	To 6 A. M.

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* The names of obervers are given in Exhibit 7, page 306.

It is probable that some observers are more careful than others to note and record fogs, and that therefore Exhibit A is somewhat incomplete. By it, however, it is possible to trace the course of some general fogs, as that of January 27, which seems on that day to have swept across the State from west to east.

EXHIBIT A.—CONTINUED.—*Number of Days, and Dates when Fogs were Recorded in 1879.*

STATIONS IN MICHIGAN.*	MAY.		JUNE.		JULY.		AUGUST.	
	No. of Days and Day of Month.	Hour of Observation.	No. of Days and Day of Month.	Hour of Observation.	No. of Days and Day of Month.	Hour of Observation.	No. of Days and Day of Month.	Hour of Observation.
NUMBER OF DAYS, IN THE STATE	2	....	4	....	11	....	23	....
Menominee*	....	....	26	7 A. M.	....	....	....	....
Alpena	14	7 A. M.	....	....	....	....	11 and 19	7 A. M.
	....	....	....	....	....	....	....	....
Grand Haven	....	....	....	....	....	....	....	....
Nirvana	....	....	....	....	....	....	5, 7, 8, 9, 14, & 23	Morn.
	....	....	....	....	....	....	....	....
Port Huron	....	....	....	....	....	....	14	7 A. M.
	....	....	....	....	....	....	....	....
	....	....	....	....	....	....	....	....
Thornville	16	Morn.	....	....	....	....	14	Morn.
	....	....	....	....	....	....	....	....
Ionia	....	....	....	....	10, 12, 14, 18, 21, and 28-30.	Morn.	2, 4, 6-9, 11, 14, 17-20, 22, 23, 25-31	Morn.
Lansing	16	7 A. M.	22	7 A. M.	....	....	4 and 14	7 A. M.
	....	....	....	....	....	....	....	....
Otisville	....	....	....	....	12	7 A. M.	6 and 14	7 A. M.
	....	....	....	....	....	....	....	....
Niles	....	....	....	....	....	....	....	....
Battle Creek	....	....	....	....	....	....	19	5 to 7 A. M.
Coldwater	....	....	....	....	....	....	....	....
Mendon	....	....	....	....	....	....	....	....
Tecumseh	....	....	....	....	....	....	....	....
Detroit	....	....	....	....	....	....	....	....
	....	....	....	....	....	....	....	....
	....	....	....	....	....	....	....	....
Washington	....	....	18, 23, and 26	Morn.	23	7 A. M.	....	....
Woodmere Cemetery	....	....	....	....	12, 13, and 23	Morn.	1 and 6	Morn.
	....	....	....	....	....	....	....	....
	....	....	....	....	....	....	....	....
	....	....	....	....	....	....	....	....
	....	....	....	....	....	....	....	....

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* The names of observers are given in Exhibit 7, page 306.

EXHIBIT A.—CONTINUED.—*Number of Days, and Dates when Fogs were Recorded in 1879.*

STATIONS IN MICHIGAN.*	SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.	
	No. of Days and Day of Month.	Hour of Observation.	No. of Days and Day of Month.	Hour of Observation.	No. of Days and Day of Month.	Hour of Observation.	No. of Days and Day of Month.	Hour of Observation.
NUMBER OF DAYS, IN THE STATE......	**18**	....	**21**	....	**9**	....	**3**	....
Menominee	....	....	1	7 A. M.	....	....	....	....
Alpena	....	....	8 and 9	Morn., P. M., Eve.	14	7 A. M.	....	....
	....	....	16	7 A. M.	....	....	....	....
Grand Haven	....	....	9 and 15	7 A. M.	....	....	....	....
Nirvana	....	....	10	Till 8 A. M.	....	....	....	....
	....	....	....	....	....	....	....	....
Port Huron	....	....	11	7 A. M., 2 P. M., and 9 P. M.	....	....	....	....
	....	....	12	7 A. M. & 9 P. M.	....	....	....	....
	....	....	15, 16, and 21	7 A. M.	....	....	....	....
Thornville	....	....	....	....	10 and 11	Morn.	5	About sunset.
	....	....	....	....	13	Morn.	....	....
Ionia	1, 5, 10, 11, 13, 14, 17-21, 23, 29, 30	Morn.	1, 3, 4, 10–12, 14–17, and 19	Morn.	15	Morn.	....	....
Lansing	10 and 23	Morn.	4, 13, and 15	Morn.	13	To 9 A. M.	....	....
	....	....	14	Morn. & day.	....	....	....	....
Otisville	23	7 A. M.	13 and 15	7 A. M.	8	9 P. M.	....	....
	....	....	....	....	10 and 13	7 A. M.	....	....
Niles	....	....	22	7 A. M.	....	....	....	....
Battle Creek	....	....	....	....	....	....	....	....
Coldwater	....	....	....	....	15	7 A. M.	....	....
Mendon	....	....	14 and 15	7 A. M.	....	....	....	....
Tecumseh	....	....	....	....	....	....	....	....
Detroit	....	....	11, 13–16, 21, 25	7 A. M.	6 and 21	7 A. M.	2	9 P. M.
	....	....	14, 15, 19, & 24	9 P. M.	....	....	3	2 P. M., & 9. P. M.
	....	....	....	....	....	....	5	7 A. M.
Washington	....	....	15, 16, and 22	7 A. M.	13 and 27	7 A. M.	....	....
Woodmere Cemetery	1, 10, 23, 25, 26	Morn.	6, 7, 10, 11, 16, 20, 21	Morn.	6	9 P. M.	3	Morn.
	22	Morn & 9 P. M.	9	After 8 P. M.	10	7 A. M.	....	....
	24	9 P. M.	13	7 A. M., nearly all day & Eve.	13	Morn.	....	....
	....	....	14	To 11 A. M., & in Eve.	....	....	....	....
	....	....	15	To 9 A. M., & after 6 P. M.	....	....	....	....

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* The names of observers are given in Exhibit 7, page 306.

RAINFALL.

At the Agricultural College the rainfall in 1879 was 5.17 inches less than that in 1878, being less in every month except November and December; it was also 3.62 inches less than the average rainfall for the preceding 15 years, being less in every month except September, November and December.

EXHIBIT 19.—*Comparison of the Rainfall during the Year and during each Month of the Year 1879, with that for the Year 1878, and with the Average for the 15 Years 1864–78. Observations made by Prof. R. C. Kedzie, at the State Agricultural College,* near Lansing, Michigan.*

YEARS, ETC.	INCHES OF RAIN AND MELTED SNOW.												
	Annual Av.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.*	Dec.*
Av. 15 Years, 1864-78	30.44	1.76	1.70	2.83	2.49	2.85	3.87	3.33	2.64	2.99	2.31	1.88	1.83
1878	31.99	1.12	2.74	3.12	3.76	3.44	3.15	2.96	1.85	3.43	1.99	2.16	2.27
1879 *	26.82	.49	1.43	1.57	1.25	2.45	2.87	2.19	1.61	3.19	1.57	4.55	3.56
In 1879 **Greater** than Av. 15 Years, 1864-78	------	----	----	------	------	------	------	------	------	.20	----	2.67	1.73
In 1879 **Less** than Av. 15 Years, 1864-78	3.62	1.27	.27	1.26	1.24	.40	1.00	1.14	1.03	------	.74	------	------
In 1879 **Greater** than in 1878	------	----	----	------	------	------	------	------	------	------	----	2.39	1.29
In 1879 **Less** than in 1878	5.17	.63	1.31	1.55	2.51	.99	.28	.77	.24	.24	.42	------	------

* For November and December, 1879, the observations were made by Harry B. Turner, at the office of the State Board of Health, Lansing.

TABLE VII.—*Inches of Rain and Melted Snow, for the Year and for each Month of the Year 1879, at 12 Stations in Michigan,—as compiled from Daily Observations made by Observers* for the State Board of Health, and for the U. S. Signal Service.*

STATIONS IN MICHIGAN.*	Geographical Divisions of the State.†	INCHES OF RAIN AND MELTED SNOW.													
		YEAR.		MONTHS, 1879.											
		1878.	1879.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 12 Stations‡	----------	[a]	36.38	1.16	2.26	1.94	1.74	2.28	3.31	3.76	2.17	5.97	2.31	5.37	4.11
Marquette.........*	U. P.†	-----	40.48	1.41	3.75	1.98	0.53	3.19	3.32	4.29	2.43	3.62	4.28	5.43	6.25
Petoskey	N.	-----	[b]	-----	-----	-----	0.87	4.01	1.88	3.02	4.08	5.72	5.58	-----	-----
Alpena	N. E.	-----	39.94	1.63	3.17	1.05	2.19	1.74	3.67	3.77	3.71	8.00	1.92	5.35	3.74
Grand Haven	W.	-----	35.35	1.81	1.86	1.19	1.49	2.46	2.42	2.61	2.47	6.01	2.58	7.23	3.22
Nirvana	W.	39.18	34.95	0.88	2.65	2.10	1.61	1.23	2.96	0.96	2.83	5.44	4.83	6.80	2.66
Port Huron	B. & E.	-----	27.23	0.84	1.27	1.56	1.78	1.32	3.25	1.97	0.64	4.37	1.42	4.84	3.97
Thornville	B. & E.	35.24	31.50	0.56	1.44	1.75	1.95	3.14	1.78	2.55	1.49	5.25	2.12	4.82	4.65
Agrl. College	C.	31.99	[c]	0.49	1.43	1.57	1.25	2.45	2.87	2.19	1.61	3.19	1.57	-----	-----
Ionia	C.	-----	[d]	-----	-----	-----	-----	3.40	2.40	3.65	1.35	5.95	5.90	4.06	2.57
Lansing	C.	-----	[e]	-----	-----	-----	-----	-----	-----	1.98	1.39	4.18	2.34	4.55	3.56
Otisville	C.	37.63	29.52	0.49	0.77	1.57	1.95	2.86	1.88	1.80	3.70	6.22	1.21	3.37	3.70
Niles	S. W.	38.06	45.84	0.60	4.90	3.05	2.58	1.38	5.72	5.40	1.32	7.47	2.60	6.44	4.38
Battle Creek	S. C.	25.40	[f]	-----	-----	-----	-----	-----	2.50	1.60	1.40	2.22	1.53	-----	-----
Coldwater	S. C.	40.24	42.96	2.35	1.50	2.80	1.78	2.83	4.27	4.70	2.37	6.63	2.10	6.36	5.27
Kalamazoo	S. C.	45.82	37.53	1.10	1.39	2.69	2.23	2.31	3.12	6.62	0.84	6.27	2.91	4.49	3.56
Mendon	S. C.	36.87	[g]	-----	1.13	-----	1.66	2.88	4.40	4.96	0.59	7.72	1.95	6.10	4.06
Tecumseh	S. C.	39.89	[h]	-----	2.16	2.78	2.83	4.04	3.69	2.97	2.13	5.01	1.10	5.50	3.84
Ypsilanti	S. C.	-----	[i]	-----	2.05	-----	1.22	1.22	-----	-----	-----	4.47	0.95	-----	2.80
Detroit	S. E.	43.39	37.17	1.11	2.64	1.68	1.56	2.64	3.85	6.22	1.31	6.23	0.83	4.71	4.39
Woodmere Cemetery.	S. E.	42.21	34.12	1.09	1.82	1.87	1.21	2.23	3.47	4.28	2.90	6.13	0.95	4.60	3.57
Washington	S. E.	-----	[j]	-----	-----	1.60	1.73	1.97	4.31	4.41	0.43	5.12	2.29	5.01	3.45

* The names of observers, their places of observation, and the counties in which these places are situated, are given in Exhibit 7, page 306.

† The names of the divisions, and the counties in each, are stated in Exhibit 1, page 227.

‡ This line is an average for only the 12 stations from which statements were received for every month of the year.

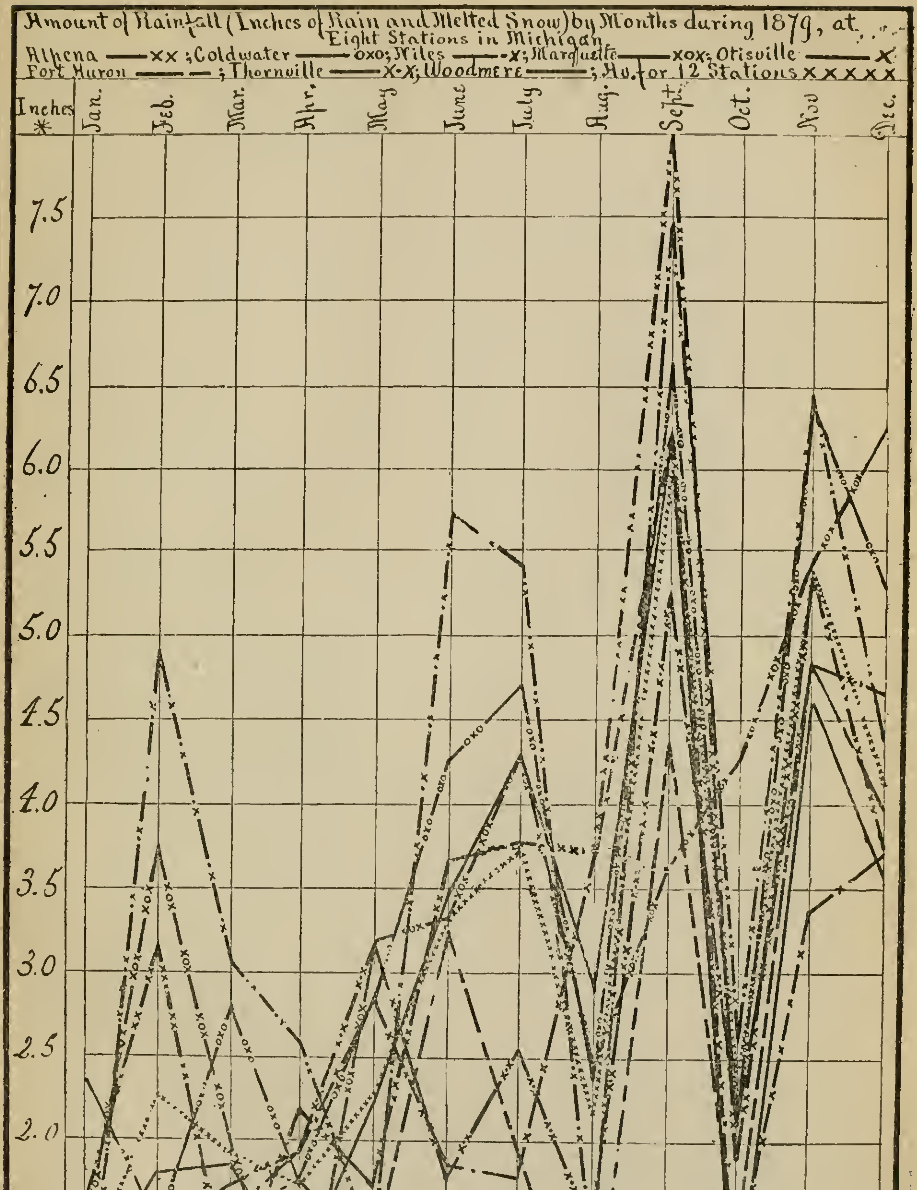
[a] The average for 12 stations in 1878 is 37.99 in. [b] For 7 months, 25.16 in. [c] Including the observations at Lansing for Nov. and Dec., the total for the year is 26.82 in. [d] For 8 months, 29.28 in. [e] For 6 months, 18.00 in. [f] For 5 months, 9.25 in. [g] For 10 months, 35.45 in. [h] For 11 months, 36.05 in. [i] For 6 months, 12.71 in. [j] For 10 months, 30.32 in.

The lines for 8 representative stations in Table VII. are graphically represented in Diagram VI., opposite this page.

OZONE.

At the Agricultural College in 1879 the day ozone was less than the average for the preceding seven years for the year and in every month except July and September; and the night ozone was less than the average for the same period for the year and in every month except August and September. The variation from 1878 was not so uniform.

DIAGRAM No. VI.—RAINFALL, BY MONTHS IN 1879.



* SCALE, ONE INCH OF RAINFALL TO .88 OF AN INCH, VERTICALLY.

Designed by Henry B. Baker. Drawn by H. B. Turner and Jno K. Allen.

EXHIBIT 20.—*Comparison of the Average Amount of Atmospheric Ozone, as Indicated by the Degree of Coloration* of Schönbein's Test-paper, during the Year and during each Month of the Year 1879. with the Average for the Seven Years 1872-8. and with the Average for 1878; also Statement of the Average for each of the Seven Years 1872-78.—Test-paper exposed from 7 A. M. to 2 P. M., for the Day Observation. and from 9 P. M. to 7. A. M., for the Night Observation,—Observations made by Prof. R. C. Kedzie, at the State Agricultural College,† near Lansing, Mich.*

MONTHS.	OZONE,—DEGREES OF COLORATION.*																				
	DAY OBSERVATION,—7 A. M. TO 2 P. M.*											NIGHT OBSERVATION,—9 P. M. TO 7 A. M.*									
	1872.	1873.	1874.	1875.	1876.	1877.	1878.	For 7 Years, 1872-8.	1879.†	In 1879 More (+), or Less (-), than Av. for 7 Yrs., 1872-8.	In 1879 More (+), or Less (-), than in 1878.	1872.	1873.	1874.	1875.	1876.	1877	1878.	For 7 Years, 1872-8.	1879.†	In 1879 More (+), or Less (-), than Av. for 7 Yrs., 1872-8.	In 1879 More (+), or Less (-), than in 1878.
Annual Av.	2.82	4.02	4.10	4.53	3.68	3.66	3.50	3.76	3.24	-.52	-.26	4.24	4.72	3.99	5.04	4.11	3.33	3.42	4.11	3.36	-.75	-.06
January	4.50	5.06	5.10	5.52	5.32	4.87	3.74	4.87	4.00	-.87	+.26	5.44	6.32	6.39	5.93	6.90	5.03	4.48	5.78	4.48	-1.30	0
February	4.00	4.21	5.53	5.78	5.76	4.54	5.00	4.97	4.54	-.43	-.46	6.00	5.93	6.10	6.57	7.27	4.14	5.33	5.91	5.01	-.90	-.32
March	3.00	4.09	5.00	5.70	6.06	5.29	4.68	4.83	3.93	-.90	-.75	5.71	5.80	6.00	6.19	7.00	6.06	4.94	5.96	4.30	-1.66	-.64
April	2.63	3.76	5.70	3.73	3.70	3.70	4.37	3.94	3.00	-.94	-1.37	5.30	4.27	6.60	3.96	5.53	4.27	4.53	4.92	4.00	-.92	-.53
May	2.14	4.58	5.80	3.19	3.10	3.29	3.97	3.72	2.79	-.93	-1.18	3.84	5.59	4.90	4.03	4.13	2.94	4.10	4.08	2.68	-1.40	-1.42
June	1.91	3.26	3.50	3.96	1.87	3.17	3.17	2.98	2.43	-.55	-.74	3.23	2.66	2.34	3.66	2.27	2.90	3.00	2.87	2.03	-.84	-.97
July	.88	3.59	1.80	3.52	2.16	2.71	2.10	2.39	2.90	+.51	+.80	2.28	3.06	1.50	3.22	1.58	1.77	1.74	2.16	2.13	-.03	+.39
August	.98	3.55	2.80	3.50	1.97	3.42	2.32	2.65	2.58	-.07	+.26	.99	2.65	1.10	3.70	1.26	1.03	1.52	1.75	1.76	+.01	+.24
September	1.40	2.30	2.90	4.30	2.60	2.93	2.23	2.67	2.87	+.20	+.64	1.86	4.27	1.20	3.68	1.73	1.53	1.60	2.27	2.53	+.26	+.93
October	1.93	4.52	3.32	5.30	3.45	3.20	2.71	3.49	3.32	-.17	+.61	3.18	4.69	3.01	6.20	3.48	3.19	1.97	3.67	2.81	-.86	+.84
November†	4.60	4.30	3.80	4.90	3.57	3.60	3.17	3.99	3.53	-.46	+.36	6.17	5.47	4.50	6.60	3.33	3.73	3.14	4.71	4.63	-.08	+1.49
December†	5.81	4.97	4.00	5.00	4.57	2.17	4.55	4.58	2.97	-1.61	-1.58	6.84	5.89	4.20	6.70	4.81	3.37	4.74	5.22	3.87	-1.35	-.87

* According to a scale of 10 degrees of coloration of Schönbein's test-paper. Maximum=10. The tinted scale is printed on page 142 of the Report of the State Board of Health for 1875.

† For November and December, 1879, the observations were made by Harry B. Turner, at the office of the State Board of Health, Lansing.

TABLE VIII.—*Relative Amount of Ozone in the Atmosphere, by Day during the Year and during each Month of the Year 1879, at 23 Stations in Michigan,—as Indicated by Averages of Observations made Daily by Exposing Test-paper prepared according to Schönbein's formula, from 7 A. M. to 2 P, M.—Recorded according to a scale of 10 Degrees of Coloration of the Test-paper (greatest coloration by Ozone equals 10), by Observers for the State Board of Health and for the U. S. Signal Service.**

STATIONS IN MICHIGAN.*	Geographical Divisions of the State.†	DEGREES OF COLORATION OF TEST-PAPER.—DAY OBSERVATIONS.													
		YEAR.		MONTHS, 1879.											
		1878.	1879.	Jan.	Feb.	Mar.	Apr.	May.	J'ne.	J'ly.	Aug.	Sept.	Oct.	Nov.	Dec.
AV. FOR 13 STATIONS ‡	----------	[a]	2.85	3 62	3.58	3.49	3.12	2.85	2.24	2.28	2.30	2.48	2.44	2.87	2.89
Marquette*	U. P.†	-----	[b]	-----	-----	-----	-----	-----	-----	-----	-----	2.35	1.84	1.97	2.00
Menominee	U. P.	-----	[c]	-----	[l]3.43	3.30	2.97	2.77	2.07[m]	1.55	1.47	0.89	2.65	3.31	-----
Petoskey	N.	2.22	2.56	2.00	2.39	2.10	2.23	1.65	1.90	2.61	3.23	3.23	2.94	3.20	3.29
Alpena	N. E.	-----	3.08	3.87	4.43	3.32	3.03	3 39	2.17	2.13	2.94	3.03	2.90	2.63	3.16
Grand Haven	W.	-----	[d]	-----	-----	-----	-----	-----	-----	-----	-----	2.87	3.03	2.77	3.03
Nirvana	W.	3.06	2.85	3.03	3.02	2.87	1.85	2.13	1.83	2.31	3.65	3.22	3.53	3.47	3.26
Port Huron	B. & E.	-----	[e]	-----	-----	-----	-----	-----	-----	-----	-----	3.07	2.74	-----	2.97
Thornville	B. & E.	2.78	1.77	4.23	2.64	2.39	1.87	1.26	1.50	1.52	0.42	1.03	0.77	1.60	2.03
Agr'l College	C.	3.50	[f]	4.00	4.54	3.93	3.00	2.79	2.43	2.90	2.58	2.87	3.32	-----	-----
Ionia	C.	-----	[g]	-----	-----	----	-----	3.45	3.73	4.10	3.94	3.63	3.74	3.77	3.77
Lansing	C.	-----	3.15	[n]3.36	3.41	3.79	2.62	2.69	1.97	3.81	3.74	3.17	2.73	3.53	2.97
Otisville	C.	3.98	2.89	2.97	2.89	3.26	3.48	3.80	3.10	2.60	2.97	2.44	2.00	2.47	2.65
Benton Harbor	S. W.	-----	[h]	3.12	3.59	2.55	2.81	-----	-----	1.62	1.55	1.96	-----	2.00	2.10
Niles	S. W.	4.50	3.22	4.26	4.43	4.61	4.07	3.19	2.87	2.48	2.27	1.90	2.94	2.83	2.77
Battle Creek	S. C.	2.89	2.22	3.13	2.86	2.87	2.57	2.77	2.40	2.68	1.23	0.93	1.48	1.73	[m]1.93
Coldwater	S. C.	3.01	[i]	3.42	3.18	3.10	-----	-----	[o]3.29	3.03	2.12	2.66	[p]2 56	2.38[m]	3.32
Kalamazoo	S. C.	2.67	2.49	2.84	2.71	2.65	2.60	2.65	2.17	1.94	1.94	2.50	2.39	2.83	2.65
Mendon	S. C.	3.08	2.67	4.31	4.75	[q]4.50	3.76[m]	2.71	1.60	0.74	0.97	1.70	1.90	2.40	2.68
Tecumseh	S. C.	4.24	3.10	4.74	4.32	4.19	4.27	3.26	2.07	1.74	2.00	2.27	[q]2.48	3.27	2.55
Ypsilanti	S. C.	-----	[j]	-----	[p]3.54	3.27	2.27	2.42	[r]1.59	-----	[s]0.82	[r]1.20	1.68	[s]2.00	[n]2.58
Detroit	S. E.	-----	[k]	-----	-----	-----	0.01	0	-----	0	-----	0	0	0	0
Woodmere Cemetery.	S. E.	4.69	4.03	4.48	4.79	5.03	4.70	4.16	3.33	2.97	2.94	4.30	3.26	4.20	4.23
Washington	S. E.	-----	2.97	3.87	[r]3.84	3.73	3.50	3.42	2.22	2.06	1.65	2.52	2.37	3.12	3.34

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* The names of observers, their places of observation, and the counties in which these places are situated, are stated in Exhibit 7, page 306.

† The full names of the divisions and the counties in each division are stated in Exhibit 1, page 227.

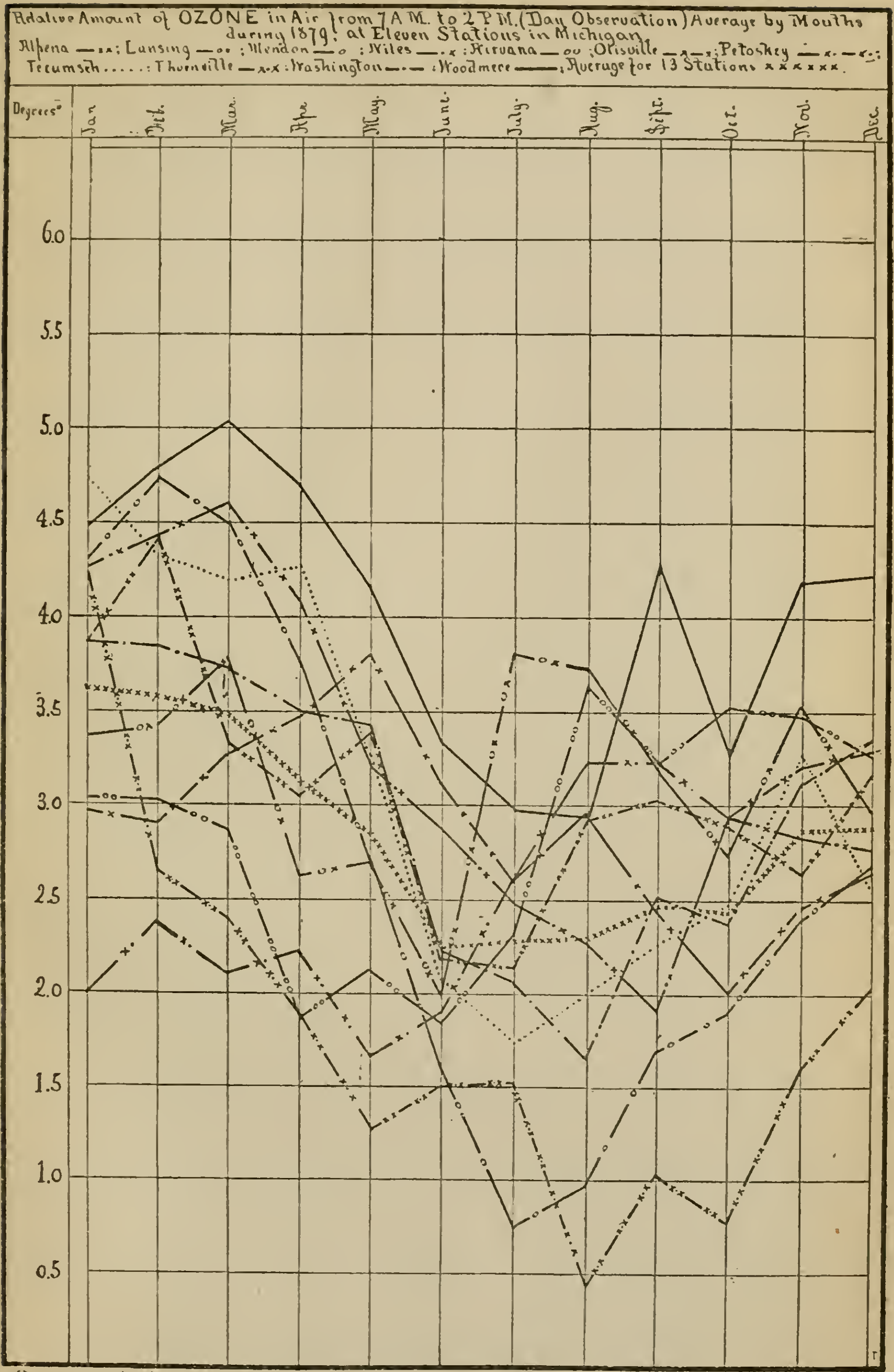
‡ An average for only the stations for which statements are given for every month of the year.

In the columns for months, the letters [l], [m], [n], etc., stand before or directly under the numbers from which they refer to the notes below.

[a] The average for 12 stations in 1878 is 3.39. [b] For 4 months, 2.04. [c] For 10 months, 2.44. [d] For 4 months, 2.93. [e] For 3 months, 2.93. [f] Including the observations at Lansing for November and December, the average of this line is 3.24. [g] For 8 months, 3.77. [h] For 9 months, 2.37. [i] For 10 months, 2.91. [j] For 10 months, 2.14. [k] For 7 months, 0.001. [l] For about 21 days. [m] For 29 days. [n] For 25 days. [o] For 17 days. [p] For 26 days. [q] For 30 days. [r] For 27 days. [s] For 28 days.

Graphic representations of 11 representative lines in this table are given in Diagram VII., opposite this page.

DIAGRAM NO. VII.—OZONE, DAY, BY MONTHS IN 1879.

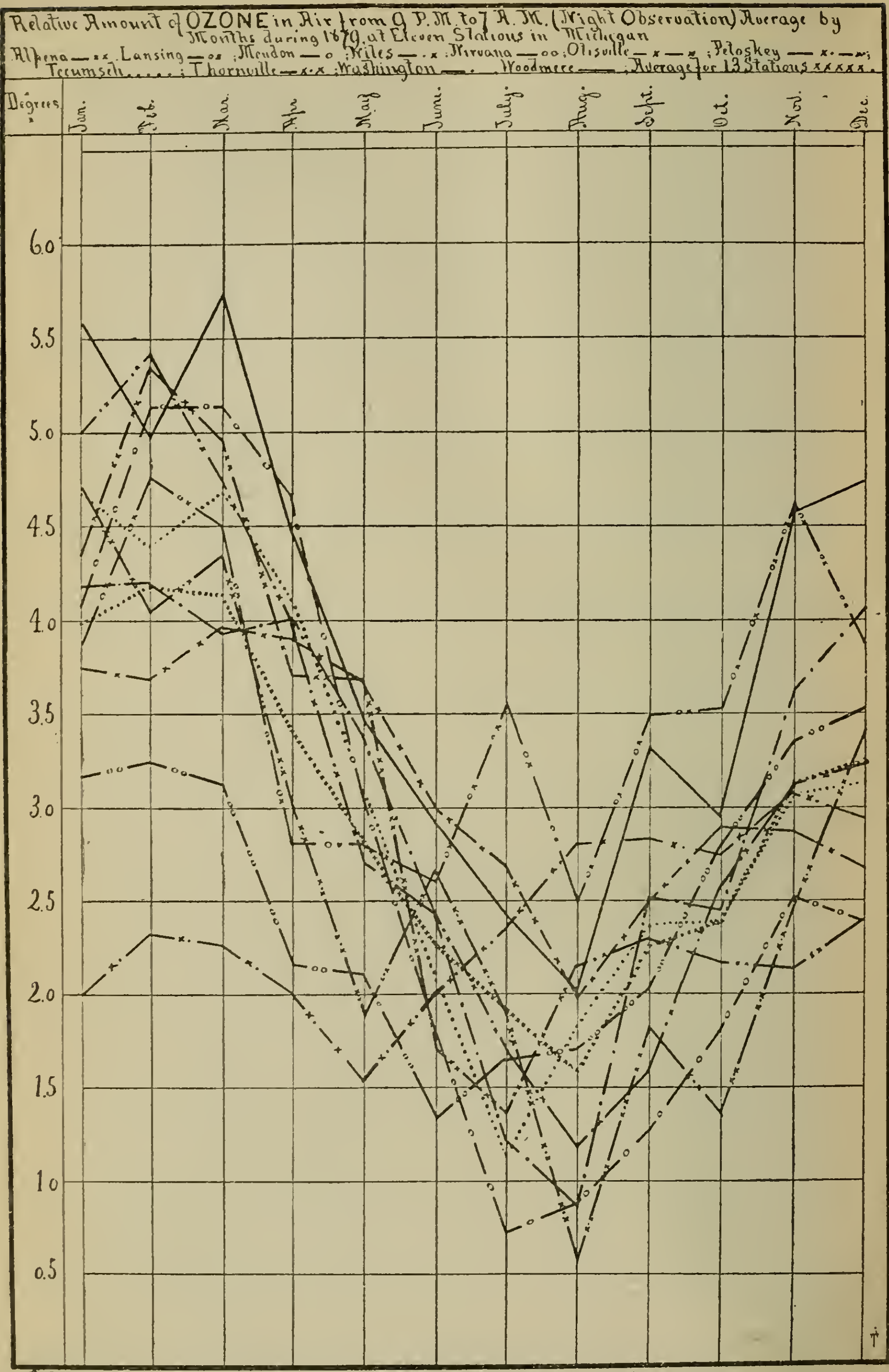


* One degree of coloration (on a scale of 10 degrees) to an inch vertically.

Drawn by H. B. Turner and Jno. K. Allen.

Designed by Henry B. Baker.

DIAGRAM NO. VIII.—OZONE, NIGHT, BY MONTHS, IN 1879.



*SCALE, one degree of coloration (on a scale of 10 degrees) to an inch vertically.

Drawn by H. B. Turner and Jno. K. Allen. Designed by Henry B. Baker.

TABLE IX.—*Relative Amount of Ozone in the Atmosphere at Night, during the Year and during each Month of the Year 1879, at 23 Stations in Michigan,—as indicated by Averages of Observations made Daily by exposing Test-paper, prepared according to Schönbien's formula, from 9 P. M. to 7 A. M.—Recorded, according to a scale of 10 Degrees of Coloration of the Test-paper (greatest coloration by Ozone equals 10), by Observers for the State Board of Health, and for the U. S. Signal Service.**

STATIONS IN MICHIGAN.*	GEOGRAPHICAL DIVISIONS OF THE STATE.†	DEGREES OF COLORATION OF TEST-PAPER.—NIGHT OBSERVATIONS.													
		YEAR.		MONTHS, 1879.											
		1878.	1879.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 13 Stations‡	--------	[a]	2.94	3.98	4.18	4.14	3.41	2.82	2.26	1.91	1.59	2.26	2.39	3.14	3.25
Marquette*	U. P.†	-----	[b]	-----	-----	-----	----	-----	-----	-----	-----	2.12	1.98	2.17	2.10
Menominee	U. P.	-----	[c]	-----	[l] 4.65	4.00	3.77	2.81	2.02	1.37	1.05	0.86	3.07	3.90	-----
Petoskey	N.	2.11	2.40	2.00	2.32	2.26	2.00	[m]1.52	2.00	2.35	2.81	2.83	2.74	3.07	2.94
Alpena	N. E.	-----	3.02	4.35	5.36	4.97	3.70	3.68	1.70	1.35	2.16	2.30	2.16	2.13	2.39
Grand Haven	W.	-----	[d]	-----	-----	-----	----	-----	-----	-----	-----	2.57	3.00	2.93	3.06
Nirvana	W.	2.57	2.51	3.16	3.25	3.13	2.15	2.11	1.33	1.65	1.71	2.02	2.79	3.35	3.52
Port Huron	B. & E.	-----	[e]	-----	-----	-----	----	-----	-----	-----	-----	3.03	2.71	-----	3.10
Thornville	B. & E.	3.09	2.68	4.71	4.04	4.35	3.00	1.87	2.67	1.90	0.55	1.83	1.35	2.47	3.42
Agrl. College, near Lansing	C.	3.42	[f]	4.48	5.01	4.30	4.00	2.68	2.03	2.13	1.76	2.53	2.81	-----	-----
Ionia	C.	-----	[g]	-----	-----	-----	----	3.20	3.57	3.74	4.16	3.93	3.71	3.73	4.06
Lansing	C.	-----	3.58	[n]3.87	4.77	4.50	2.80	2.80	2.60	3.56	2.48	3.50	3.52	4.63	3.87
Otisville	C.	4.40	3.13	3.74	3.68	3.97	3.90	3.67	3.00	2.67	1.97	2.50	2.90	2.87	2.69
Benton Harbor	S. W.	-----	[h]	3 23	4.07	3.27	3.04	-----	-----	1.96	1.54	2.33	-----	-----	2.97
Niles	S. W.	4.18	3.14	5.00	5.43	4.74	4.00	2.71	2.43	1.69	1.18	1.58	2.58	3.13	3.23
Battle Creek	S. C.	3.00	2.09	3.10	3.50	2.97	2.73	2.68	2.33	2.39	0.42	0.67	0.68	1.43	[o] 2.13
Coldwater	S. C.	3.61	[i]	3.74	3.46	3.13	----	-----	[p] 3.59	3.79	4.08	2.96	[q]2.58	[o]2.69	2.87
Kalamazoo	S. C.	3.17	2.85	3.26	3.29	3.39	2.80	2.58	2.17	1.81	1.77	2.68	2.71	3.97	3.71
Mendon	S. C.	3.21	2.79	4.07	5.14	[o]5.14	4.67	3.06	1.79	0.71	[r]0.87	1.27	1.81	2.53	2.39
Tecumseh	S. C.	3.95	3.08	4.68	4.39	4.68	4.10	3.10	2.07	1.13	1.84	2.37	2.39	3.07	3.13
Ypsilanti	S. C.	-----	[j]	3.64	[n] 3.40	3.80	2.50	1.87	[m]1.67	-----	[s]1.14	[o]1.76	1.71	[s]1.96	[m]3.15
Detroit	S. E.	-----	[k]	0.16	0.92	-----	0.02	0	-----	0	-----	0	0	0	0
Woodmere Cemetery, near Detroit	S. E.	4.47	3.93	5.58	4.96	5.74	4.47	3.45	2.90	2.42	2.00	3.33	2.94	4.60	4.74
Washington	S. E.	-----	3.07	4.18	[m]4.20	3.92	4.00	3.39	2.42	1.21	0.85	2.52	2.45	3.63	4.05

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* The names of observers, their places of observation, and the counties in which these places are situated, are stated in Exhibit 7, page 306.

† The full names of the divisions and the counties in each division, are stated in Exhibit 1, page 227.

‡ This line is an average for only the stations for which statements are given for every month of the year.

[a] The average for 12 stations in 1878 is 3.43. [b] For 4 months, 2.09. [c] For 10 months, 2.75. [d] For 4 months, 2.89. [e] For 3 months, 2.95. [f] Including the observations at Lansing for Nov. and Dec., the average of this line is 3.36. [g] For 8 months, 3.76. [h] For 8 months, 2.80. [i] For 10 months, 3.29. [j] For 11 months, 2.42. [k] For 9 months, 0.12. [l] For about 21 days. [m] For 27 days. [n] For the last 25 days. [o] For 29 days. [p] For 17 days. [q] For 26 days. [r] For 30 days. [s] For 28 days.

Graphic representations of 11 representative lines in this table are given in Diagram VIII., opposite this page.

VELOCITY AND DIRECTION OF THE WIND.

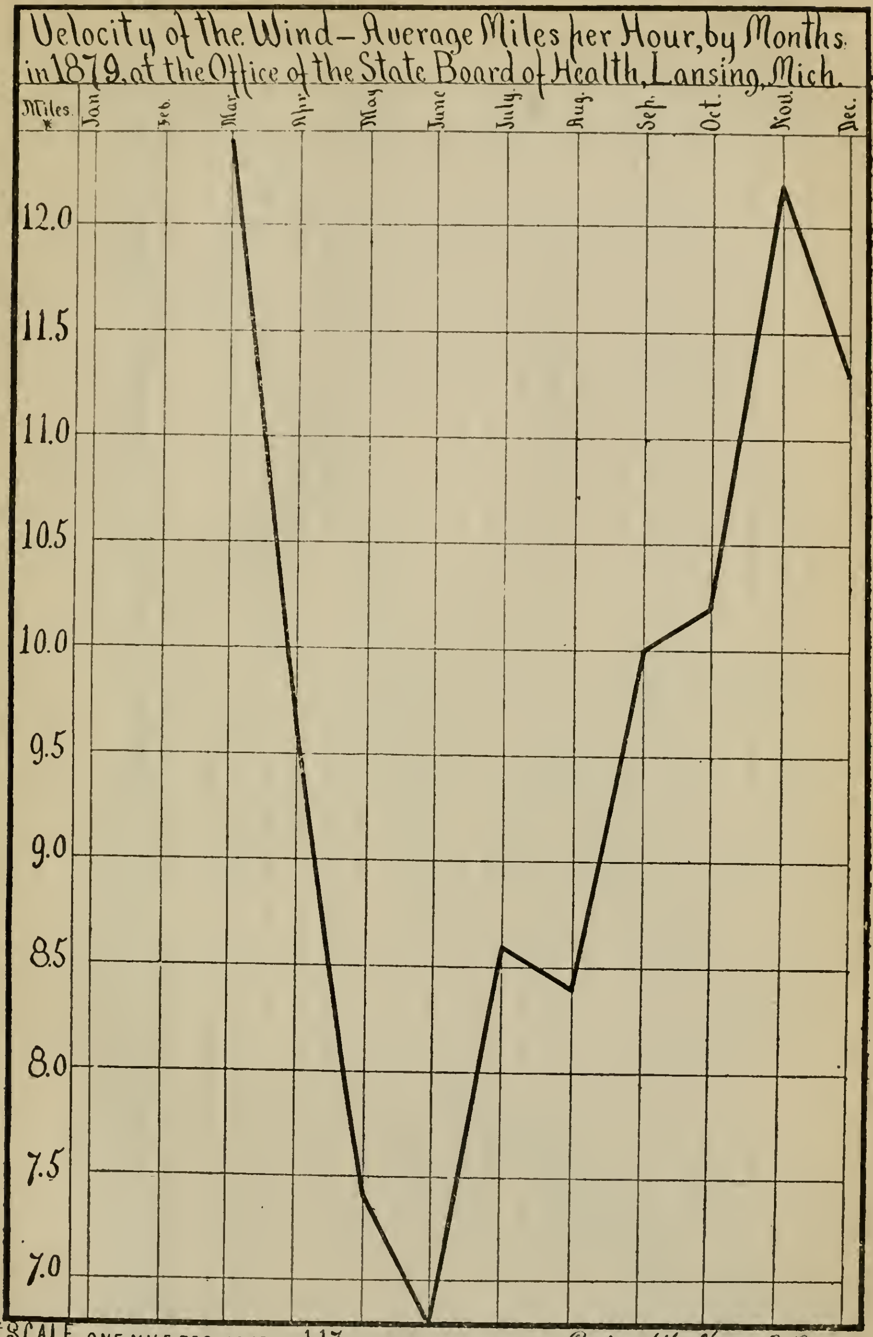
While the general course of the line representing the average velocity of the wind in 1879 (Diagram IX., page 351) is similar to that of the line for 1878 (Diagram VIII., page 375 of the Report for 1879), the lowest point for 1879 is the same as the highest point for 1878, representing a velocity of 6.8 miles per hour. This great difference may be in part explained by the fact that in March, 1879, the anemometer was moved from the roof of the old "State-Offices" building to the roof of the new capitol building, a much higher position.

The least average velocity in 1879 occurred in June, whereas in 1878 it was in July and August. In October, 1879, the wind was, as compared with other months of the year, lower than in October, 1878, though the average velocity actually recorded was greater in October, 1879, than in October, 1878, by four miles per hour. This relatively low wind in October, 1879, should be considered in connection with the high temperature of that month. By comparing Table XI., page 354, with Table X., page 380 of the Report for 1879, or Diagram XI., page 355, with Diagram X., page 381 of the Report for 1879, it would seem that winds from the north, northwest, west, and southwest, were slightly less prevalent, and winds from the other four main points of compass slightly more prevalent in October 1879 than in October 1878.

By the tables and diagrams relating to the direction of the wind, pages 354–60, it will be noticed that some observers report a much larger proportion of calms than do others. This is probably in part due to a difference in judgment of observers as to what shall be regarded as a calm. Observers may do well to compare the summaries of their own reports with those of others.

The most notable occurrence during the month was the heavy wind storm of the 19th and 20th. From 4:15 of the 19th to 4:15 of the 20th, there were 640 miles of wind passed over the station.—*J. A. Barwick, Serg't Sig. Corps, U. S. A., Alpena, on November register.*

DIAGRAM NO. IX.—VELOCITY OF THE WIND, BY MONTHS IN 1879.



*SCALE, ONE MILE PER HOUR TO 1.17 INCHES VERTICALLY.

Designed by Henry B. Baker.

Drawn by H. B. Turner and Jno. K. Allen.

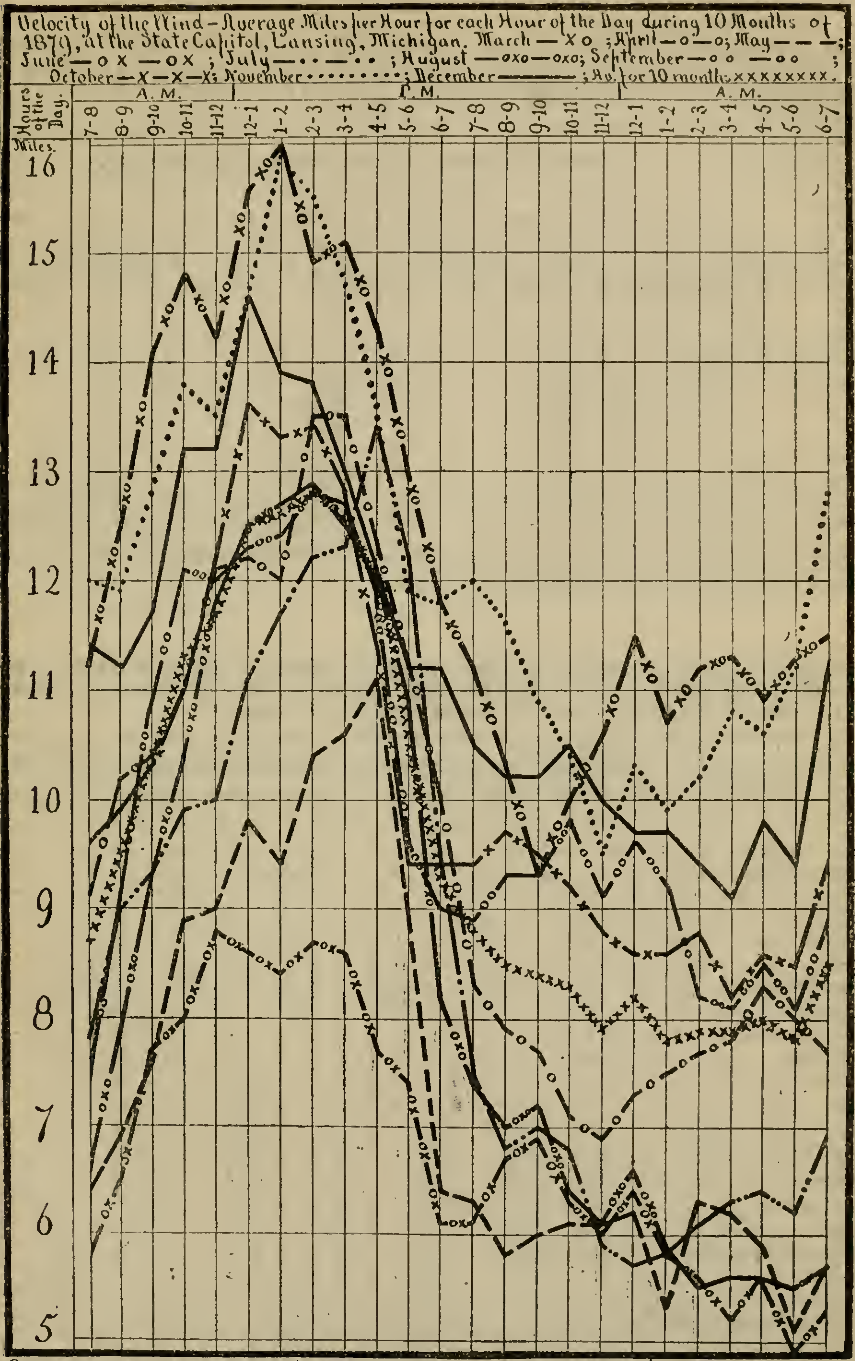
TABLE X.—*Average Velocity of the Wind, in Miles per Hour, during each Hour of the Day, by Months, for Ten Months of the Year 1879.—Compiled from Registers of the Robinson's Self-Registering Anemometer in the Office of the State Board of Health, State Capitol, Lansing, Michigan.*

MONTHS,—1879.	HOURS, AND MILES PER HOUR.																								
	AVERAGE.	A. M.					P. M.												A. M.						
		7–8	8–9	9–10	10–11	11–12	12–1	1–2	2–3	3–4	4–5	5–6	6–7	7–8	8–9	9–10	10–11	11–12	12–1	1–2	2–3	3–4	4–5	5–6	6–7
AV., 10 MONTHS	9.7	8.7	9.5	10.4	11.3	11.7	12.5	12.6	12.8	12.6	12.0	10.6	9.3	8.8	8.5	8.4	8.3	7.9	8.2	7.8	7.9	7.9	8.0	7.8	8.5
March[a]	12.4	11.2	12.5	14.1	14.8	14.2	15.6	16.0	14.9	15.1	14.3	13.0	11.8	11.2	10.3	9.3	10.0	10.6	11.5	10.7	11.2	11.3	10.9	11.3	11.5
April	9.6	9.1	10.2	10.4	11.0	12.1	12.2	12.0	13.5	13.5	12.3	11.2	10.0	8.3	7.9	7.7	7.1	6.9	7.3	7.5	7.7	7.8	8.3	8.0	7.7
May	7.4	6.4	6.9	7.6	8.9	9.0	9.8	9.4	10.4	10.6	11.1	9.0	6.4	6.3	5.8	6.0	6.1	6.1	6.2	5.3	6.3	6.2	5.9	5.1	5.7
June	6.8	5.8	6.5	7.7	8.0	8.8	8.6	8.4	8.7	8.6	7.7	7.4	6.1	6.1	6.7	6.9	6.3	6.0	6.4	5.8	5.6	5.2	5.6	4.9	5.3
July	8.6	7.8	9.0	9.3	9.9	10.0	11.1	11.7	12.2	12.3	13.4	12.2	9.5	7.5	6.8	7.0	6.8	5.9	5.7	5.8	6.1	6.3	6.4	6.2	6.9
August	8.4	6.6	7.9	9.3	10.4	11.8	12.5	12.7	12.9	12.5	12.0	10.9	8.2	7.4	7.0	7.2	6.4	6.1	6.6	5.9	5.5	5.6	5.6	5.5	5.7
September[b]	10.0	7.5	9.1	10.9	12.1	12.0	12.3	12.4	12.8	12.7	11.9	9.6	9.0	8.9	9.3	9.3	9.8	9.1	9.6	9.2	8.2	8.1	8.5	8.1	8.9
October[c]	10.2	9.6	9.9	10.3	11.0	12.2	13.6	13.3	13.4	12.8	11.4	9.4	9.4	9.4	9.7	9.5	9.2	8.8	8.6	8.6	8.8	8.2	8.6	8.5	9.4
November	12.2	12.0	11.9	12.8	13.8	13.5	14.6	15.9	15.5	14.7	13.6	11.9	11.8	12.0	11.6	10.9	10.4	9.5	10.3	9.9	10.2	10.8	10.6	11.2	12.8
December	11.3	11.4	11.2	11.7	13.2	13.2	14.6	13.9	13.8	13.0	12.1	11.2	11.2	10.5	10.2	10.2	10.5	10.0	9.7	9.7	9.4	9.1	9.8	9.4	11.2

[a] For only about 27 days. [b] For only about 28 days. [c] For only about 30 days.

The statements in the first figure-column in Table X., of the average velocity of the wind in miles per hour, are graphically represented for ten months of the year 1879, in Diagram IX., page 351. The remaining columns of Table X. are graphically represented in Diagram X., page 353.

DIAGRAM No. X.—VELOCITY OF THE WIND AT EACH HOUR, 1879.



SCALE, one mile per hour to .6 of an inch, vertically. Designed by Henry B. Baker.

Drawn by H. B. Turner and Jno. K. Allen.

TABLE XI.—*Number of Observations per Month (at 7 A. M., 2 P. M., and 9 P. M., daily), at which the Wind was Blowing from each of the Eight Principal Points of Compass, during the Year and during each Month of the Year 1879,—Average for 16 Stations in Michigan.**

POINTS OF COMPASS.	AVERAGE NUMBER OF OBSERVATIONS PER MONTH, 1879.												
	Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
All Observations.	91	93	84	93	90	93	90	93	93	90	93	90	92
Calm	6	4	4	4	6	6	6	7	8	6	7	4	4
North	6	3	5	6	10	7	8	6	6	5	4	4	4
North-east	7	3	6	6	11	11	7	8	10	4	4	5	8
East	5	3	5	7	5	6	4	3	5	5	3	3	7
South-east	9	6	11	12	9	13	6	7	5	7	10	9	11
South	10	11	7	7	6	10	11	9	9	12	16	15	8
South-west	18	29	11	13	12	14	11	25	22	18	22	19	20
West	16	18	17	19	9	12	12	18	15	17	16	17	18
North-west	16	15	19	19	22	14	18	10	13	17	11	15	13

Graphic representations of statements in Tables XI. and XII. are given in Diagrams XI. and XII., opposite this page.

TABLE XII.—*Average Number of Observations per Month, for the Year 1879, at which the Wind was Blowing from each of the Eight Principal Points of Compass, at each of 16 Stations in Michigan; also the Average for All said Stations.**

STATIONS IN MICHIGAN.*	Divisions of the State.†	AVERAGE NUMBER OF OBSERVATIONS PER MONTH, IN 1879.									
		All Obs.	Calms.	N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.
Average, 16 Stations	----------	91	6	6	7	5	9	10	18	16	16
Marquette*	U. P.†	91	6	6	5	4	8	6	15	14	26
Petoskey	N.	91	4	1	2	1	9	5	29	19	23
Alpena	N. E.	91	5	6	5	4	17	8	10	16	20
Grand Haven	W.	91	4	10	8	10	6	11	15	14	14
Nirvana	W.	91	4	4	14	9	9	2	32	6	11
Port Huron	B. & E.	91	2	13	12	4	6	21	13	12	9
Thornville	B. & E.	91	15	2	9	2	12	7	20	12	12
Otisville	C.	91	1	3	6	5	17	5	20	12	21
Niles	S. W.	91	0	3	2	2	6	5	22	32	20
Battle Creek	S. C.	91	2	3	8	4	10	14	8	20	14
Kalamazoo	S. C.	91	1	4	6	2	12	14	28	8	17
Mendon	S. C.	89	4	6	7	5	8	21	14	16	11
Tecumseh	S. C.	91	10	6	4	5	8	8	14	21	17
Detroit	S. E.	91	1	8	10	8	4	8	26	16	10
Woodmere Cemetery	S. E.	91	3	8	8	6	3	17	14	22	12
Washington	S. E.	91	29	8	6	3	5	7	9	13	11

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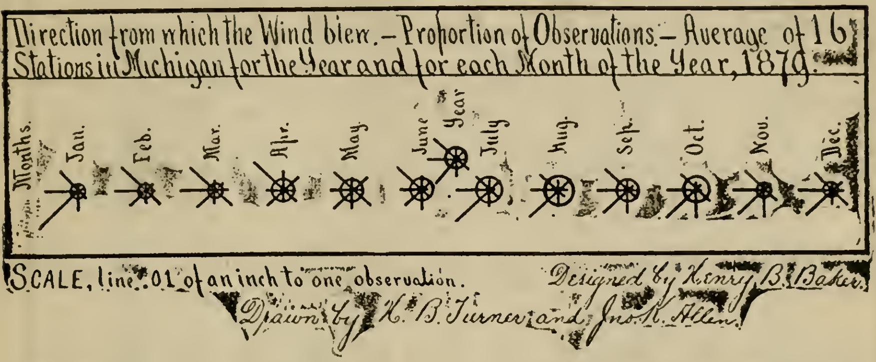
* The names of observers, their places of observation, and the counties, and divisions of the State, in which these places are situated, are stated in Exhibit 7, page 306.

† The full names of the divisions, and the counties in each division, are stated in Exhibit 1, page 227.

DIAGRAM No. XI.—DIRECTION OF THE WIND IN MICHIGAN, BY MONTHS IN 1879.

NORTH.



Explanations of the construction and manner of reading Diagrams XI., XII., and XIII., are given on pages 307–8. The top of each diagram is North; and the scale is such that each one-hundredth of an inch on the line represents one observation of the wind from the direction indicated by the line. Calms are represented by circles. Comments on the subject of the direction of the wind, and on calms, are printed on page 350.

DIAGRAM No. XII.—DIRECTION OF THE WIND AT STATIONS IN MICHIGAN, 1879.

NORTH.

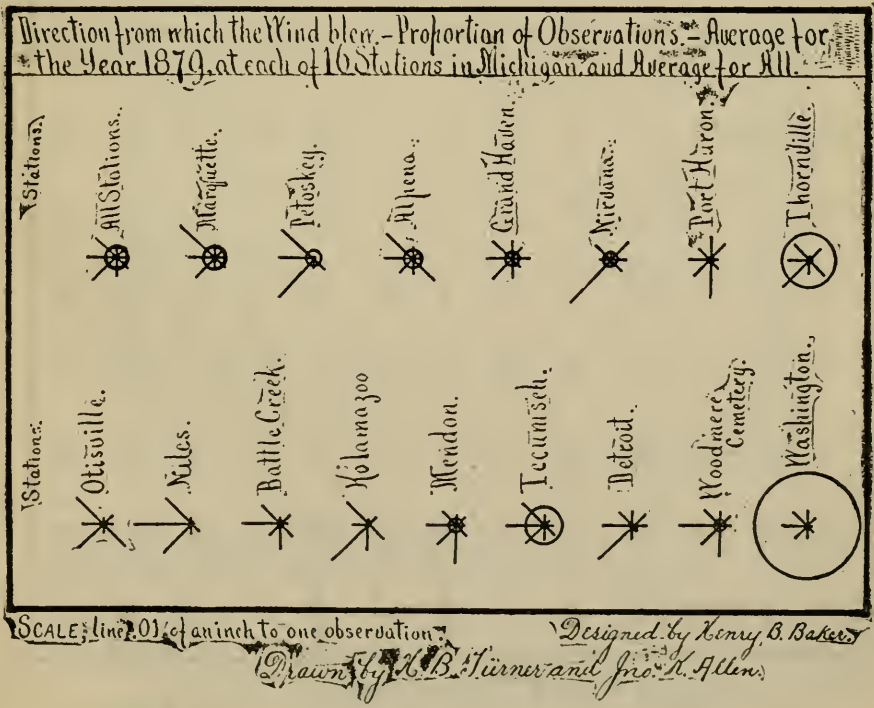
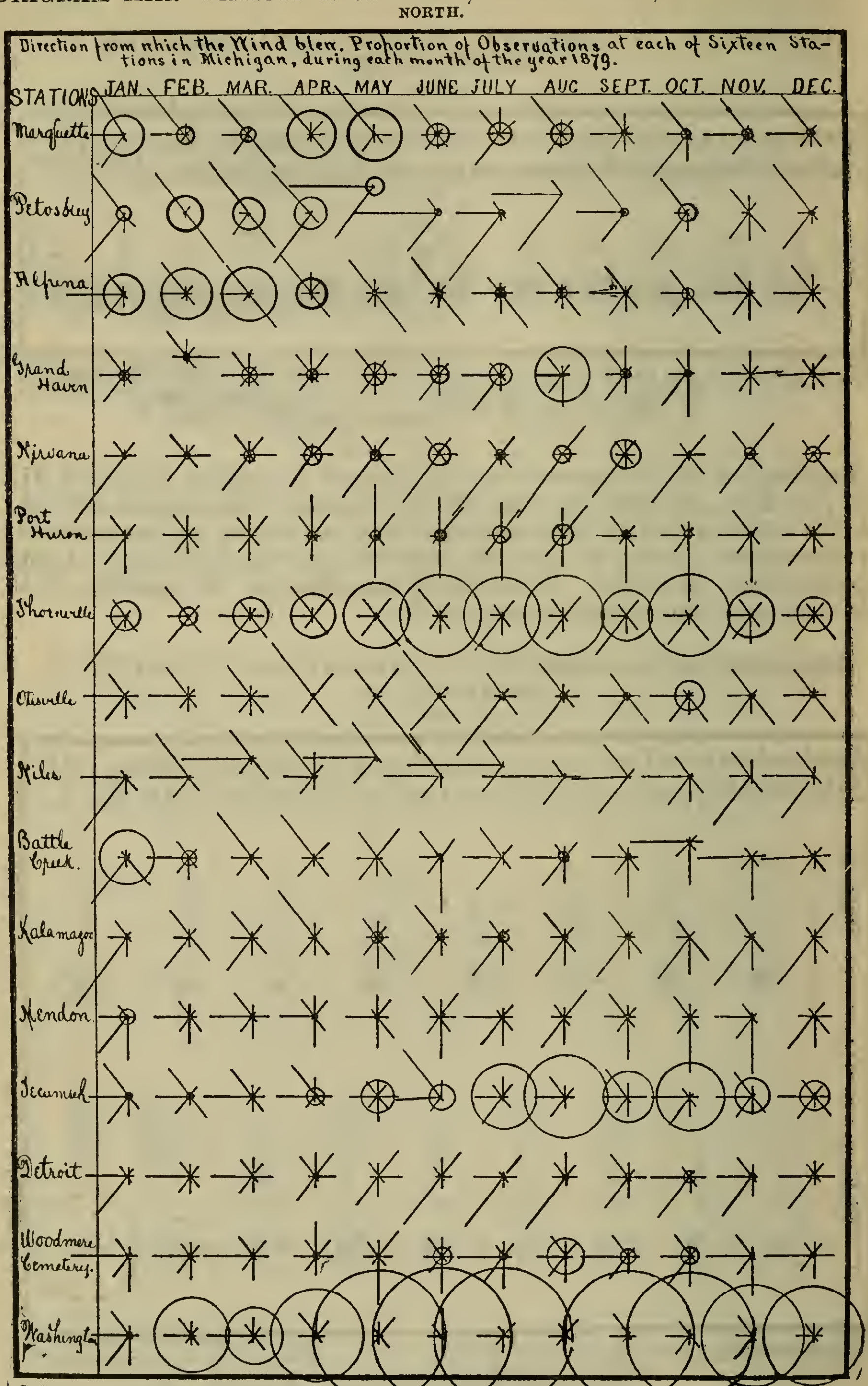


DIAGRAM XIII.—DIRECTION OF WIND, AT STATIONS, MONTHS IN 1879.



SCALE, *line .01 of an inch to one observation.*

Drawn by H.B. Turner.

Designed by Henry B Baker.

TABLE XIII.—*Number of Observations for each Month of the Year 1879, at which the Wind was Blowing from each of the Eight Principal Points of Compass, at each of 23 Stations* in Michigan; also the Average for the 16 of said Stations from which nearly Complete Observations were received for the Year. (Observations made at 7 A. M., 2 P. M., and 9 P. M., Daily.)*

STATIONS IN MICHIGAN.*	DIVISIONS OF THE STATE.†	JANUARY.										FEBRUARY.										MARCH.									
		Total.	Calm.	N.	N. E.	E.	S.E.	S.	S. W.	W.	N.W.	Total.	Calm.	N.	N. E.	E.	S.E.	S.	S. W.	W.	N.W.	Total.	Calm.	N.	N. E.	E.	S.E.	S.	S. W.	W.	N.W.
Average for 16 Stations....‡	......	93	4	3	3	3	6	11	29	18	15	84	4	5	6	5	11	7	11	17	19	93	4	6	6	7	12	7	13	19	19
Marquette ....*	U.P.†	93	11	2	2	0	4	3	22	19	30	84	5	7	4	3	6	0	5	20	34	93	4	4	4	0	24	3	13	15	26
Menominee	U. P.	93	0	14	5	9	6	12	6	33	8	84	0	19	6	3	9	3	3	18	23	93	0	8	11	7	13	10	4	18	22
Petoskey.	N.	93	4	1	1	1	10	11	35	1	29	84	10	0	5	0	35	3	1	1	29	93	9	0	0	1	24	2	15	5	37
Alpena...........	N. E.	93	11	5	2	0	3	8	17	33	14	84	14	4	6	4	9	5	5	14	23	93	15	1	3	3	24	3	6	17	21
Grand Haven...	W.	93	3	9	6	10	7	7	19	14	18	84	2	11	8	19	9	4	3	9	19	93	4	12	6	14	8	7	9	17	16
Nirvana..........	W.	93	1	3	10	7	2	2	47	11	10	84	2	6	8	13	9	0	19	12	15	93	3	8	13	15	4	5	25	6	14
Port Huron.....	B.& E.	93	0	3	8	3	3	22	21	19	14	84	0	11	6	5	9	11	13	14	15	93	0	12	14	3	8	15	13	15	13
Thornville......	B.& E.	93	8	0	4	1	11	7	39	11	12	84	5	1	9	2	12	3	19	12	21	93	10	4	4	7	16	3	21	18	10
Agrl. College...	C.	89	23	0	2	2	5	2	42	7	6	84	19	0	7	0	10	3	9	7	29	93	20	0	5	0	9	5	29	6	19
Ionia..............	C.	......	......	--	.....	--	.....	--	.....	---	.....	......	......	--	.....	--	.....	--	.....	---	.....	......	......	--	.....	--	.....	--	.....	---	.....
Lansing..........	C.	73	24	0	4	0	1	6	25	8	5	84	30	0	3	0	7	6	9	5	24	87	21	0	2	4	7	16	15	15	7
Otisville	C.	93	0	2	3	7	9	13	18	25	16	83	0	6	5	4	8	8	8	23	21	93	0	6	5	10	11	11	11	17	22
Benton Harbor.	S.W.	91	15	6	1	2	8	24	9	20	6	84	7	1	2	7	12	13	7	20	12	87	15	10	2	9	3	11	17	10	10
Niles	S.W.	93	0	0	1	3	9	10	39	26	5	84	0	0	1	3	10	1	15	23	31	93	0	0	2	2	15	3	11	40	20
Battle Creek ...	S. C.	93	15	4	3	2	20	5	33	6	5	84	4	2	7	5	7	12	11	24	12	93	1	2	7	6	15	5	13	12	32
Coldwater......	S. C.	93	0	1	0	0	0	7	67	16	2	84	0	5	4	4	2	13	28	26	2	48	0	1	3	7	0	11	8	14	4
Kalamazoo......	S. C.	93	0	2	3	2	3	12	49	11	11	84	0	4	5	0	17	6	23	10	19	93	0	3	9	3	12	11	24	13	18
Mendon..........	S. C.	87	4	1	1	4	2	25	26	16	8	83	0	7	5	3	10	16	10	21	11	87	0	7	3	9	3	12	11	25	17
Tecumseh	S. C.	93	2	2	2	1	8	12	20	23	23	84	2	2	6	1	16	5	13	20	19	93	1	6	6	6	10	9	6	29	20
Ypsilanti........	S. C.	89	0	2	3	0	2	6	45	27	4	84	0	1	9	2	11	3	20	15	20	93	0	1	6	6	14	8	12	27	19
Detroit...........	S. E.	93	0	5	5	3	3	5	39	25	8	84	0	7	7	4	7	10	12	26	11	93	0	11	9	11	4	9	13	24	12
Woodmere Cem.	S. E.	93	0	5	2	4	1	21	15	33	12	84	1	8	7	5	5	14	13	22	9	93	0	4	10	8	3	11	11	29	14
Washington.....	S. E.	93	0	5	2	5	2	17	23	22	17	84	21	8	5	3	7	6	6	16	12	93	16	11	6	6	10	4	5	27	8

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* The names of observers, their places of observation, and the counties in which these places are situated, are stated in Exhibit 7, page 306.

† The full names of the divisions and the counties in each division, are stated in Exhibit 1, page 227.

‡ This line is an average for only the 16 stations from which statements nearly complete were received for every month of the year; it does not include the lines for Menominee, Agricultural College, Lansing Ionia, Benton Harbor, Coldwater, or Ypsilanti.

Graphic representations of statements for 16 lines in this table are given in Diagram XIII., page 356, which is explained on pages 307–8.

TABLE XIII.—CONTINUED.—*Direction of Wind, Months in 1879.—Observations at which the Wind was Blowing from Directions Named.*

STATIONS IN MICHIGAN.*	DIVISIONS OF THE STATE.†	APRIL.										MAY.										JUNE.									
		Total.	Calm.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Total.	Calm.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Total.	Calm.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.
Average for 16 Stations....‡	......	90	6	10	11	5	9	6	12	9	22	93	6	7	11	6	13	10	14	12	14	90	6	8	7	4	6	11	11	12	18
Marquette.	U. P.†	90	13	7	10	7	12	4	5	3	29	93	15	6	1	10	7	5	12	2	35	90	6	7	5	10	9	9	12	10	22
Menominee	U. P.	90	0	10	41	15	10	3	2	3	6	93	0	9	30	13	22	19	0	0	0	90	0	0	23	12	22	28	5	0	0
Petoskey........	N.	90	9	0	2	0	7	0	35	4	33	93	5	0	0	0	0	1	37	48	2	90	2	1	2	0	0	0	28	47	10
Alpena...........	N. E.	90	8	12	10	5	17	4	1	6	27	93	1	8	4	7	28	8	7	6	24	90	2	7	6	4	23	8	7	7	26
Grand Haven...	W.	90	3	15	15	10	6	5	12	9	15	93	6	7	10	12	7	12	13	8	18	90	5	10	8	5	2	13	19	13	15
Nirvana..........	W.	90	5	6	20	11	5	1	22	7	13	93	3	5	12	11	15	2	30	2	13	90	6	3	11	10	7	1	35	4	13
Port Huron.....	B. & E.	90	3	23	15	4	4	15	7	5	14	93	3	29	16	1	7	24	8	4	1	90	3	22	20	1	4	24	7	6	3
Thornville......	B. & E.	90	12	4	16	0	12	4	9	12	21	93	18	1	12	1	21	3	14	11	12	90	23	3	9	4	9	10	10	5	17
Agrl. College...	C.	89	17	1	14	0	6	3	16	4	28	93	37	2	10	3	8	6	14	5	8	90	25	11	6	3	5	7	22	5	6
Ionia.............	C.	......	......	..	....	..	....	..	.....	...	.....	90	0	2	28	5	8	5	16	8	18	90	0	6	27	0	6	5	20	6	20
Lansing..........	C.	88	33	6	3	1	3	3	10	8	21	83	23	5	2	0	2	6	16	23	6	89	2	9	15	0	7	15	21	12	8
Otisville	C.	90	0	1	16	0	21	0	12	1	39	93	0	1	19	3	40	0	9	1	20	90	0	2	7	3	19	0	25	0	34
Benton Harbor.	S. W.	81	24	16	8	6	5	5	5	6	6	......	......	..	.....	..	....	..	.....	...	.....	......	......	..	.....	..	....	..	.....	...	.....
Niles	S. W.	90	0	14	8	2	1	8	13	18	26	93	0	0	0	0	4	2	20	42	25	90	0	1	0	0	2	7	17	33	30
Battle Creek....	S. C.	90	0	2	12	5	11	5	14	7	31	93	0	0	20	3	13	11	16	12	18	90	0	2	13	0	1	31	12	12	19
Coldwater.......	S. C.	89	0	1	1	5	30	7	10	11	24	93	0	2	21	6	10	8	29	8	9	90	0	4	11	7	13	11	27	8	9
Kalamazoo......	S. C.	90	0	8	6	1	13	11	14	4	33	93	3	9	7	6	16	18	14	7	13	87	2	5	5	4	6	11	27	4	23
Mendon..........	S. C.	86	1	12	11	1	9	17	2	20	13	91	0	13	13	6	15	17	2	19	6	89	0	10	2	8	9	24	13	7	16
Tecumseh	S. C.	90	5	10	2	9	7	3	9	23	22	93	9	9	8	11	8	14	8	16	10	90	7	9	0	0	2	1	10	26	35
Ypsilanti........	S. C.	90	0	9	13	4	8	8	17	17	14	93	0	5	11	14	18	12	13	8	12	86	0	17	12	2	2	18	14	10	11
Detroit...........	S. E.	90	1	14	16	11	3	7	18	5	15	93	0	8	19	13	4	12	21	6	10	90	1	11	17	6	2	7	35	4	7
Woodmere Cem.	S. E.	90	2	19	12	9	2	11	11	12	11	93	0	9	18	8	6	27	6	9	10	90	5	11	7	6	4	21	12	11	13
Washington	S. E.	90	26	12	11	4	5	2	4	10	16	93	37	8	14	2	9	5	7	4	7	90	39	13	4	1	2	10	2	8	8

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* The names of observers, their places of observation, and the counties in which these places are situated, are stated in Exhibit 7, page 306.

† The full names of the divisions and the counties in each division are stated in Exhibit 1, page 227.

‡ This line is an average for only the 16 stations from which statements nearly complete were received for every month of the year; it does not include the lines for Menominee, Agricultural College, Lansing, Ionia, Benton Harbor, Coldwater, or Ypsilanti.

Graphic representations of statements for 16 lines in this table are given in Diagram XIII., page 356, which is explained on pages 307–8.

TABLE XIII.—CONTINUED.—*Direction of Wind, Months in 1879.—Observations at which the Wind was Blowing from Directions Named.*

STATIONS IN MICHIGAN.*	DIVISIONS OF THE STATE.†	JULY.										AUGUST.										SEPTEMBER.									
		Total.	Calm.	N.	N. E.	E.	S.E.	S	S.W.	W.	N.W.	Total.	Calm.	N.	N. E.	E.	S.E.	S.	S.W.	W.	N.W.	Total.	Calm.	N.	N. E.	E.	S.E.	S.	S.W.	W.	N.W.
Average for 16 Stations....‡	......	93	7	6	8	3	7	9	25	18	10	93	8	6	10	5	5	9	22	15	13	90	6	5	4	5	7	12	18	17	17
Marquette......	U. P.†	93	6	15	11	6	4	2	23	8	18	93	6	8	10	6	5	8	14	9	27	90	1	11	4	5	8	11	12	20	18
Menominee.....	U. P.	93	0	0	21	10	14	22	17	6	0	93	6	0	19	5	30	8	20	3	2	90	4	2	19	10	24	17	14	0	0
Petoskey	N.	93	1	0	0	2	3	5	48	26	8	93	0	0	0	0	0	0	41	41	11	90	2	0	1	0	1	1	22	28	35
Alpena...........	N. E.	93	3	6	5	7	25	12	6	17	12	93	3	5	5	10	17	9	7	15	22	90	0	4	6	2	11	11	16	21	19
Grand Haven...	W.	93	6	6	6	3	5	10	26	22	9	93	15	5	7	4	2	19	13	15	13	90	3	16	5	3	2	12	19	12	18
Nirvana	W.	93	3	1	13	5	10	5	43	4	9	93	5	0	21	8	6	0	44	4	5	90	8	7	9	5	7	7	31	6	10
Port Huron.....	B.&E.	93	5	19	17	0	3	25	15	9	0	93	6	15	21	3	3	17	16	6	6	90	3	3	7	6	7	27	6	17	11
Thornville......	B.&E.	93	21	1	10	2	8	11	25	7	8	93	22	4	14	1	4	10	17	9	12	90	14	0	10	0	10	10	29	9	8
Agrl. College...	C.	92	31	5	2	1	2	4	21	17	6	92	34	11	7	2	1	4	27	3	3	90	31	2	7	0	7	7	14	7	15
Ionia.............	C.	93	0	4	19	4	8	3	16	21	18	93	0	3	25	0	4	2	22	16	21	90	1	7	7	6	9	6	18	15	21
Lansing..........	C.	92	0	0	14	5	6	14	29	15	9	93	1	5	17	1	4	12	33	8	12	90	4	4	5	3	10	21	19	13	11
Otisville	C.	92	1	2	5	7	12	2	42	5	16	92	2	7	5	9	8	4	29	5	23	88	2	1	0	7	19	3	24	16	16
Benton Harbor	S.W.	90	25	9	2	3	7	6	17	12	9	83	23	4	7	2	8	6	17	5	11	74	6	4	2	3	15	7	23	3	11
Niles............	S.W.	93	0	1	0	0	1	0	19	51	18	93	0	2	1	8	2	1	21	47	11	90	0	0	5	2	1	0	27	32	23
Battle Creek....	S. C.	93	0	3	9	0	8	4	24	24	21	93	3	5	11	2	3	15	21	25	8	90	1	5	3	5	10	23	13	21	9
Coldwater......	S. C.	91	0	3	11	9	4	4	37	6	14	87	0	3	18	3	0	3	35	8	17	90	0	7	11	4	7	17	22	0	22
Kalamazoo......	S. C.	93	3	4	5	1	10	17	28	13	12	93	1	5	7	0	10	16	27	9	18	90	1	3	3	4	12	13	29	7	18
Mendon.........	S. C.	93	0	5	9	5	9	17	20	23	5	90	0	5	19	4	6	17	22	8	9	88	0	6	6	4	7	25	10	11	16
Tecumseh	S. C.	93	18	11	8	2	7	2	20	16	9	93	23	6	6	5	1	7	14	17	14	90	14	7	0	10	3	11	11	14	20
Ypsilanti........	S. C.	91	0	6	13	2	1	12	28	19	10	88	5	3	9	4	6	6	18	25	12	86	5	4	7	3	9	10	13	12	23
Detroit..........	S. E.	93	0	3	16	7	4	6	36	17	4	93	1	14	9	6	2	5	37	8	11	90	1	8	5	10	3	12	23	13	15
Woodmere Cem.	S. E.	93	3	8	9	5	0	18	17	26	7	93	10	8	9	4	1	15	15	17	14	90	4	4	6	6	1	10	17	27	15
Washington	S. E.	93	39	3	10	2	3	9	6	15	6	93	37	10	12	2	3	5	7	10	7	90	36	5	1	5	2	12	4	10	15

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* The names of observers, their places of observation, and the counties in which these places are situated, are stated in Exhibit 7, page 306.

† The full names of the divisions and the counties in each division are stated in Exhibit 1, page 227.

‡ This line is an average for only the 16 stations from which statements nearly complete were received for every month of the year; it does not include the lines for Menominee, Agricultural College, Lansing, Ionia, Benton Harbor, Coldwater, or Ypsilanti.

Graphic representations of statements for 16 lines in this table are given in Diagram XIII., page 356, which is explained on pages 307–8.

TABLE XIII.—CONTINUED.—*Directions of Wind, Months in 1879.—Observations at which the Wind was Blowing from Directions Named.*

STATIONS IN MICHIGAN.*	DIVISIONS OF THE STATE.†	OCTOBER.										NOVEMBER.										DECEMBER.									
		Total.	Calm.	N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.	Total.	Calm.	N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.	Total.	Calm.	N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.
Average for 16 Stations....‡	......	93	7	4	4	3	10	16	22	16	11	90	4	4	5	3	9	15	19	17	15	92	4	4	8	7	11	8	20	18	13
Marquette......	U. P.†	93	3	3	0	0	5	16	31	12	23	90	3	5	3	2	7	4	15	26	25	93	2	2	6	2	10	8	10	26	27
Menominee......	U. P.	93	3	1	11	10	26	28	7	1	6	80	1	10	21	10	17	9	3	4	5	......	......	--	----	--	----	--	----	----	------
Petoskey	N.	93	5	2	3	0	4	11	35	8	25	90	0	10	7	0	15	17	19	5	17	93	1	1	6	2	6	7	26	9	35
Alpena..........	N. E.	93	3	2	1	1	28	9	16	16	17	90	0	7	2	3	10	16	16	21	15	93	0	10	6	4	11	5	15	23	19
Grand Haven...	W.	93	2	14	1	4	2	25	23	11	11	90	0	13	6	18	8	12	11	15	7	93	1	5	13	16	9	9	10	20	10
Nirvana.........	W.	93	0	2	14	9	14	3	34	9	8	90	3	1	22	5	11	1	28	3	16	93	4	1	14	10	21	0	27	6	10
Port Huron	B.&E.	93	2	7	4	3	3	38	13	16	7	90	1	1	5	1	7	26	13	19	17	93	2	5	7	12	9	11	22	18	7
Thornville......	B.&E.	93	23	0	7	1	18	5	21	15	3	90	13	0	9	2	9	16	17	13	11	93	10	4	8	4	18	5	19	18	7
Agrl. College...	C.	93	34	2	3	1	4	8	20	6	15	......	......	--	-----	--	----	--	----	--	----	......	......	--	----	--	----	--	----	----	------
Ionia.............	C.	93	0	5	15	4	4	10	29	24	2	90	0	5	10	0	4	16	28	18	9	93	0	0	14	0	9	2	42	21	5
Lansing..........	C.	93	0	1	5	2	16	16	26	19	8	90	0	1	3	3	14	10	26	19	14	93	0	1	12	7	18	4	22	21	8
Otisville	C.	92	8	3	3	2	18	11	19	23	5	90	1	0	4	2	20	10	20	14	19	91	2	4	3	7	19	2	19	17	18
Benton Harbor.	S. W.	......	......	--	----	--	----	--	-----	--	----	45	3	3	4	4	1	11	1	13	5	92	12	5	5	6	11	16	9	24	7
Niles	S. W.	93	0	0	1	1	13	15	21	28	14	90	0	9	0	0	11	4	35	13	18	93	0	5	0	0	6	5	30	30	17
Battle Creek...	S. C.	93	0	3	5	7	7	24	11	34	2	90	0	1	4	7	6	24	10	31	7	87	0	3	6	9	10	7	13	30	9
Coldwater	S. C.	93	1	0	2	8	16	23	16	9	18	90	0	0	2	2	11	7	36	10	22	93	0	1	8	9	15	6	37	10	7
Kalamazoo.......	S. C.	93	0	2	4	0	17	21	30	8	11	90	0	1	3	1	11	20	34	5	15	93	0	4	16	4	11	15	34	2	7
Mendon	S. C.	87	0	7	4	4	8	32	12	5	15	90	0	2	3	2	5	33	15	21	9	91	0	1	9	10	14	18	24	10	5
Tecumseh	S. C.	93	19	3	2	4	6	11	20	22	6	90	10	5	1	0	12	10	15	20	17	93	8	2	7	8	14	6	16	21	11
Ypsilanti.........	S. C.	88	7	0	10	1	12	8	25	14	11	88	6	0	7	2	9	6	36	15	7	82	0	3	18	9	9	2	5	30	6
Detroit...........	S. E.	93	3	3	4	9	6	9	29	23	7	90	2	7	0	3	4	11	23	21	14	93	1	9	9	12	5	5	24	20	8
Woodmere Cem.	S. E.	93	5	4	6	3	5	17	21	17	15	90	0	5	3	1	2	23	14	27	15	93	1	8	8	11	1	14	12	29	9
Washington	S. E.	93	36	3	2	1	8	5	13	14	11	90	29	3	3	2	3	10	16	10	14	93	28	7	7	6	4	4	19	10	8

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* The names of observers, their places of observation, and the counties in which these places are situated, are stated in Exhibit 7, page 306.

† The full names of the divisions and the counties in each division are stated in Exhibit 1, page 227.

‡ This line is an average for only the 16 stations from which statements nearly complete were received for every month of the year; it does not include the lines for Menominee, Agricultural College, Lansing, Ionia, Benton Harbor, Coldwater, or Ypsilanti.

Graphic representations of statements for 16 lines in this table are given in Diagram XIII., page 356, which is explained on pages 307–8.

EXHIBIT 21.—*Comparison of the Average Atmospheric Pressure during the Year and during each Month of the Year 1879, with Averages for the 15 Years 1864–78; also with Averages for the four Years 1875–1878; and for the Year 1878,—Inches of Mercury in the Barometer. Corrected for Temperature and for Instrumental Error.—Observations made at 7 A. M., 2 P. M., and 9 P. M., Daily, by Prof. R. C. Kedzie at the State Agricultural College*, near Lansing, Michigan.*

YEARS, ETC.	AVERAGE ATMOSPHERIC PRESSURE,—INCHES OF MERCURY.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.*	Dec.*
Av. 15 Years—'64-78†	29.010	29.026	29.003	28.976	28.959	28.967	28.995	29.016	29.035	29.078	29.044	29.019	29.034
Av. 4 Years—'75-78†	29.016	29.047	29.010	28.933	28.962	29.023	28.986	29.038	29.020	29.064	29.014	29.035	29.059
1878	29.041	29.087	29.024	29.015	28.863	29.001	29.018	29.073	28.998	29.145	29.068	29.069	29.135
1879*	29.083	29.118	29.095	29.090	29.038	29.104	29.061	29.045	29.088	29.140	29.148	29.029	29.034
In 1879 **Higher** than Av. 15 Years, 1864-78	.073	.092	.092	.114	.079	.137	.066	.029	.053	.062	.104	.010	0
In 1879 **Higher** than Av. 4 Years, 1875-78	.067	.071	.085	.157	.076	.081	.075	.007	.068	.076	.134	-----	-----
In 1879 **Lower** than Av. 4 Years, 1875-78	-------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	.006	.025
In 1879 **Higher** than in 1878	.042	.031	.081	.075	.175	.103	.043	-----	.090	-----	.080	-----	-----
In 1879 **Lower** than in 1878	-------	-----	-----	-----	-----	-----	-----	.028	-----	.005	-----	.040	.101

* For November and December, 1879, the observations were made by Harry B. Turner, at the office of the State Board of Health, Lansing.

† Pike's barometer was used prior to 1875, Green's standard barometer has been used since 1874. To the observations from 1864-1874 inclusive, .12 in. has been added for instrumental error. From those from 1875 to 1879 .012 in. has been subtracted for instrumental error.

The record of the barometer at the Agricultural College is higher than that for the State Board of Health in every month of the year.

October 25, highest barometer since I have kept record, 30.704 in. (corrected). [Probably corrected for temperature and reduced to sea level. The 7 A. M. observation simply corrected for temperature is 30.030 in.]—*Supt. F. W. Higgins, on Oct. register.*

TABLE XIV.—*Average Atmospheric Pressure, for the Year, and for each Month in the Year 1879, at 19 Stations in Michigan, as indicated by the Height, in inches, of Mercury in the Barometer. Corrected for Temperature,—Reduced to 32° F., (for some Stations not corrected for Instrumental Errors §).—Average¶ of Observations made Daily at 7 A. M., 2 P. M., and 9 P. M., by Observers* for the State Board of Health and for the U. S. Signal Service.*

STATIONS IN MICHIGAN.*	GEOGRAPHICAL DIVISIONS OF THE STATE.†	INCHES OF MERCURY,—ATMOSPHERIC PRESSURE.													
		YEAR.		MONTHS, 1879.											
		1878.	1879.	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.
Average for 13 Stations ‡	------------	[a]	29.155	29.169	29.173	29.163	29.122	29.176	29.121	29.091	29.106	29.188	29.221	29.152	29.176
Marquette *, §	U. P. †	--------	29.267	29.249	29.323	29.272	29.310	29.311	29.233	29.189	29.215	29.275	29.271	29.260	29.299
Menominee	U. P.	--------	[b]	29.251	29.305	29.265	29.270	29.285	[h] 29.229	29.182	29.208	29.279	29.285	[i] 29.229	--------
Alpena §, ¶	N. E.	--------	29.340	29.312	29.369	29.362	29.329	29.379	29.317	29.277	29.307	29.377	29.397	29.267	29.387
Grand Haven §	W.	--------	29.359	29.385	29.333	29.300	29.337	29.373	29.331	29.301	29.316	29.403	29.439	29.364	29.372
Nirvana	W.	--------	29.054	29.049	29.070	29.080	29.036	29.069	29.026	28.987	29.013	29.095	29.120	29.043	29.057
Port Huron §	B. & E.	--------	29.341	29.334	29.341	29.359	29.296	29.365	29.303	29.276	29.290	29.384	29.423	29.349	29.372
Thornville	B. & E.	--------	[c]	--------	28.937	28.945	28.903	28.982	28.926	28.902	28.916	29.000	29.029	28.942	28.949
Agrl. College, near Lansing §	C.	29.053	[d]	29.118	29.095	29.090	29.038	29.104	29.061	29.045	29.088	29.140	29.148	--------	--------
Lansing §	C.	--------	29.045	[j] 29.057	29.045	29.015	[k] 29.004	[l] 29.085	29.016	28.998	29.030	29.106	29.115	29.029	29.034
Otisville	C.	29.040	[e]	28.703	28.692	28.698	28.649	28.700	--------	[m] 29.065	[m] 29.095	[h] 29.158	[o] 29.211	[o] 29.156	[o] 29.162
Benton Harbor	S. W.	29.482	[f]	[o] 29.596	[j] 29.609	[l] 29.602	[j] 29.540	--------	--------	[k] 29.535	[l] 29.539	[n] 29.608	--------	[p] 29.663	[m] 29.614
Battle Creek	S. C.	28.651	28.655	28.659	28.685	28.662	28.611	28.665	28.600	28.578	28.610	28.701	28.733	28.675	[o] 28.680
Kalamazoo	S. C.	29.037	29.099	29.121	29.103	29.112	29.059	29.112	[o] 29.057	29.043	29.055	29.136	29.175	29.103	29.106
Mendon	S. C.	29.011	[g]	[k] 29.695	[k] 29.299	[k] 29.256	[l] 29.120	[o] 29.040	[o] 28.791	[m] 28.694	[o] 28.774	[h] 28.897	[k] 28.886	[o] 28.880	[o] 28.860
Tecumseh	S. C.	--------	29.041	29.136	29.111	29.104	29.005	29.049	29.063	28.996	28.938	29.015	29.071	28.992	29.016
Ypsilanti	S. C.	--------	28.942	[m] 29.000	28.939	28.937	28.874	28.956	[h] 28.893	[o] 28.866	[l] 28.890	[h] 28.958	[o] 29.009	[k] 28.980	[j] 29.004
Detroit §, ¶	S. E.	29.268	29.348	29.362	29.355	29.362	29.292	29.366	29.297	29.281	29.295	29.395	29.433	29.365	29.375
Woodmere Cem., near Detroit §	S. E.	29.320	29.387	29.399	29.399	29.400	29.333	29.399	29.343	29.318	29.331	29.427	29.470	29.406	29.419
Washington	S. E.	--------	29.135	29.130	[k] 29.132	29.152	29.096	29.160	29.092	29.067	29.088	29.174	29.216	29.142	29.167

* The names of observers, their places of observation, and the counties in which these places are situated, are stated in Exhibit 7, page 306.

† The full names of the divisions and the counties in each division are stated in Exhibit 1, page 227.

‡ This line is an average for only 13 of the localities from which reports were received for every month of the year. It does not include the line for Mendon, as the barometer used at Mendon was not a standard barometer.

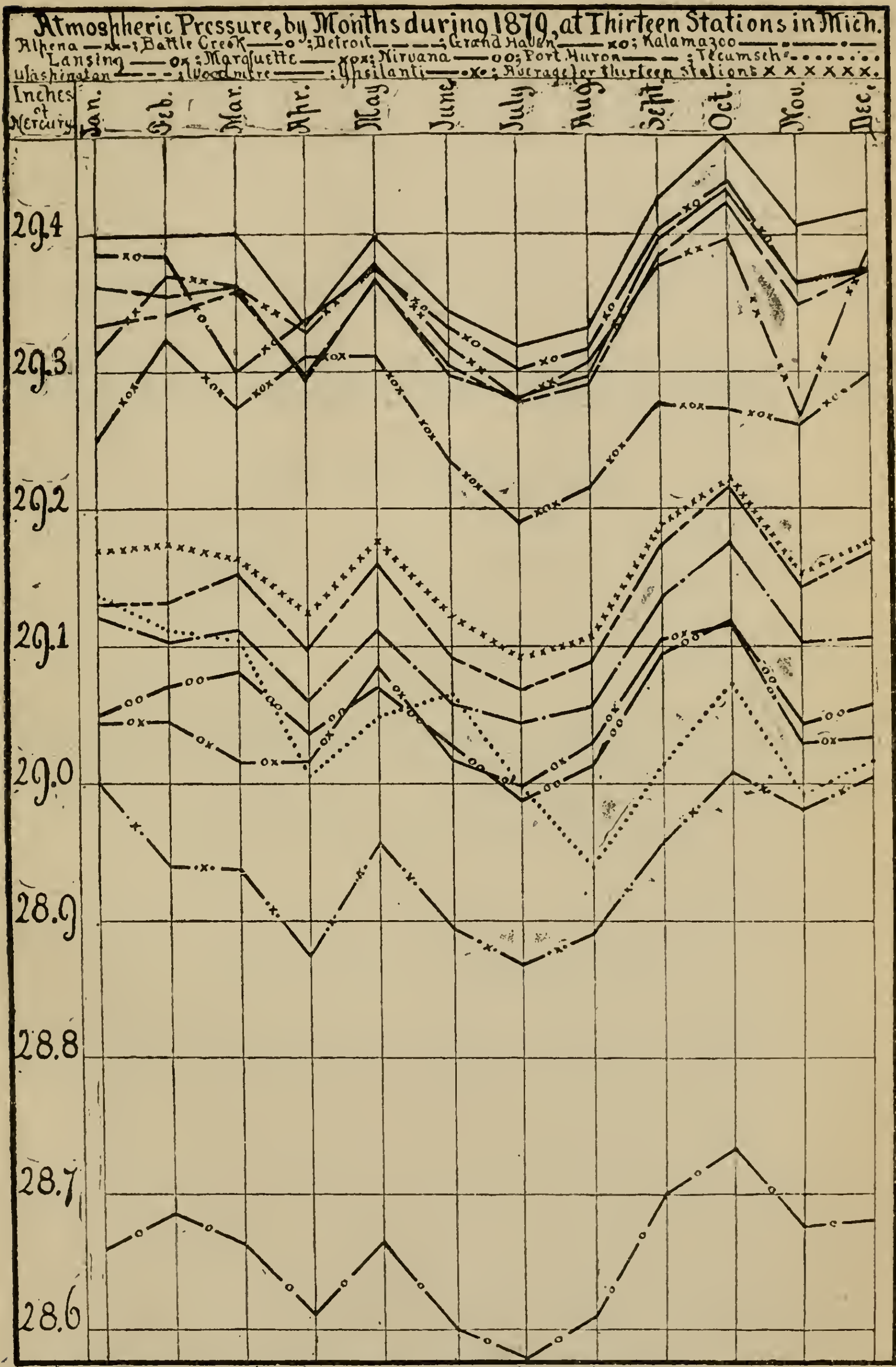
§ For stations marked thus (§) a correction has been made for instrumental error, as follows: For Marquette, .004 in. added; for Alpena, .043 subtracted; for Grand Haven, .002 added; for Port Huron, .001 added; for the Agricultural College, .012 subtracted; for Lansing, .002 added; for Detroit, .009 added till April 6, 1879, and .017 added for the rest of the year; for Woodmere Cemetery, .010 subtracted. For other stations the instrumental error of barometer is not known.

¶ The daily "means" from which the numbers in the lines for Alpena, Port Huron, and Detroit were computed at those stations, were found by multiplying the 9 P. M. observation by 2, adding the other two observations, and dividing the sum by 4. For the other stations, the daily averages were computed by dividing the sum of the three daily observations by 3.

[a] The average for 8 stations in 1878 is 29.108 in. [b] For 11 months, 29.253. [c] For 11 months, 28.948. [d] Including the observations at Lansing for Nov. and Dec., the average of this line is 29.083 in. [e] For 11 months, 28.935. [f] For 9 months, 29.589. [g] For 12 months, 29.016; the barometer used at Mendon in 1879 not being a standard barometer, the line for Mendon has not been included in the average line. The facts that the barometer at Mendon was moved into the house June 1, and that it has been reduced by the same tables as the other barometers, may explain its being so low from June to December, as compared with the first half of the year. [h] For 28 days. [i] For 24 days. [j] For 25 days. [k] For 27 days. [l] For 26 days. [m] For 30 days. [n] For 19 days. [o] For 29 days. [p] For last 15 days.

Graphic representations of 13 representative lines in this table are given in Diagram XIV., opposite this page.

DIAGRAM No. XIV.—ATMOSPHERIC PRESSURE, BY MONTHS, IN 1879.



*SCALE, .1 inch of mercury to .74 inch vertically.

DESIGNED BY HENRY B. BAKER. DRAWN BY H. B. TURNER AND JNO. K. ALLEN.

WEEKLY REPORTS OF DISEASES

IN MICHIGAN

DURING THE YEAR 1879,

INCLUDING A

COMPILATION OF THE WEEKLY REPORTS FROM HEALTH OFFICERS OF CITIES AND FROM REGULAR CORRESPONDENTS OF THE

STATE BOARD OF HEALTH.

Compiled in the Office of the Secretary of the Board.

WEEKLY REPORTS OF DISEASES IN MICHIGAN DURING THE YEAR ENDING WITH DECEMBER, 1879.

In this article, Table 1 gives a summary for the State by months, showing for each month the disease which caused most sickness, and the order of prevalence of all the *prominent diseases*. The first six pages of Table 2 also give statements for the whole State so far as represented by the localities from which reports were received. The remaining pages of Table 2 relate to the several geographical divisions of the State. Table 3 gives statements for localities, and is of interest to observers of diseases and others who may wish to study the sickness of any locality, or compare different localities. Table 4 gives a summary for the year for the six divisions from which the most reports were received.

The general reader who is not interested in the details of localities and divisions of the State, should omit Table 3, and the last 8 pages of Table 2, and turn to Exhibit A, which shows what disease caused most sickness, and to other exhibits, Table 4, and to the diagrams and comparative exhibits in the latter part of the paper, where are given final results of the study by means of weekly reports, and a coördination of these results with the results of the study of the meteorology of the State, as given on pages 303–363.

BRIEF HISTORY AND INTRODUCTORY STATEMENT OF PLAN.

Since September, 1876, weekly reports of the diseases present in various parts of the State have been received by the State Board of Health from health officers of cities and from regular correspondents of the Board. Summaries made from these reports have been published in the Annual Reports of the Board for the years 1876–7–8–9. This paper continues the summary for the calendar year 1879, or for the 53 weeks ending with Saturday, Jan. 3, 1880. It includes also four diagrams representing by months the relative prevalence of the 24 diseases tabulated, and about 12 exhibits comparing by months the prevalence of some of the leading diseases with the prevalence or absence of given meteorological conditions.

In the Report for 1879 the method of securing and the plan of marking these weekly reports were thus explained:—

> The blanks for the weekly reports upon which this compilation is based are printed on postal cards, which are supplied to such regular Correspondents of the Board as consent to make reports, and to the Health Officers of all cities for which a return of the name of a Health Officer has been received. Blank record-books, in which to preserve copies of the reports, together with comments, etc., are also supplied to these Observers of Diseases, to be retained by them. The reports are forwarded weekly to the Secretary of the State Board, at Lansing.
>
> The plan of making the report is as follows: Each observer to mark the disease of which there

was the greatest number of cases during the week for which the report is made, 1; that of which there was the next greatest number of cases, 2; the next 3, and so on, applying *consecutive* numbers to the diseases reported present, but marking with the *same* figure all diseases of which there is the same number of cases; to write 0 opposite each disease mentioned of which there was no case; to apply these numbers without regard to severity of the cases; to include all cases, without regard to when they were taken sick, so long as they are actually sick with the given disease; to include all cases within the knowledge or reasonable belief of the observer, without regard to who may have charge of them; to indicate the severity of the diseases reported, by the signs =, +, and —, denoting respectively that a disease was usually severe, more than usually, or less than usually severe. It has not seemed best to ask for an exact statement of the number of cases, though a blank is left for that purpose, on the margin of the card, for the convenience of those observers who prefer to state the number of cases rather than the order of prevalence by the foregoing method.

To illustrate the method of making the reports the following copy of one of the blanks now in use is given, correctly marked, in the "prevalence" column, for the number of cases stated on the right-hand margin. Names of diseases and figures printed in italics are not printed on the postal blanks, but are supposed to have been written on the report by the observer.

Diseases in..,
☞ [Please Date.]

week ending Sat.,.............................., *188*.....

No.........

Ed. 17.

	Prevalence. Order. See a.	Severity. See b.	Cases.
Brain, Inflammation of.....	*14*	+	*1*
Bowels, Inflammation of...	*12*	—	*3*
Bronchitis	*11*	=	*4*
Cerebro-spinal Meningitis	*0*	....	*0*
Cholera Infantum...........	*8*	—	*7*
Cholera Morbus	*10*	+	*5*
Consumption, Pulmonary.	*10*	—	*5*
Croup, Membranous	*12*	+	*3*
Diphtheria.....................	*5*	=	*11*
Diarrhea.........................	*3*	=	*15*
Dysentery.......................	*8*	+	*7*
Erysipelas.......................	*13*	=	*2*
Fever, Intermittent	*2*	+	*19*
Fever, Remittent............	*11*	=	*4*
Fever, Typhoid (Enteric) .	*0*	....	*0*
Fever, Typho-malarial.....	*9*	+	*6*
Influenza........................	*7*	—	*9*
Measles...........................	*1*	=	*24*
Neuralgia	*14*	+	*1*
Pneumonia......................	*9*	=	*6*
Puerperal Fever..............	*0*	....	*0*
Rheumatism	*6*	+	*10*
Scarlatina	*4*	+	*12*
Small-pox	*0*	....	*0*
Tonsilitis.........................	*11*	—	*4*
Whooping-cough.............	*0*	....	*0*
Mumps..........................	*6*	+	*10*
Dyspepsia......................	*11*	+	*4*
....	....	....	....

a. Please mark the disease of which there is the greatest number of cases, 1; the disease having next greatest number of cases, 2; the next, 3; and so on for each disease, writing the same figures opposite diseases having the same number of cases. Write 0 opposite diseases not present. [For entire plan, see "Printed Letter Stating Plan," or pages 240-7, Fifth Annual Report of S. B. of H.] A blank indicates that the item has been overlooked.

b. The sign = indicates the usual severity, + indicates more, — indicates less than the usual severity.

Please mail this, signed and dated, as soon as convenient after close of week specified.

....

...., *M. D.*

The present satisfactory system of weekly reports of diseases to the State Board of Health was begun by asking from leading physicians throughout the State regular reports of such sickness as came under their observation. They were not asked to report the number of cases in their own practice or in that of other physicians, but from their "best knowledge" to number the diseases reported, the disease of which there were the most cases being marked 1, that of which there was the next greatest number being marked 2, the next 3, and so on; diseases of which there was not a single case were marked 0. This they did easily, freely, and satisfactorily. Then the demand was made on the health officers of cities for just such reports as were made by the voluntary observers, namely, reports of the order of prevalence, or of the absence of certain diseases "according to their best knowledge;" but they were not asked to collect their information from *all* practitioners nor to demand from any one a report of all diseases. The law requiring reports of "diseases dangerous to the public health" (contagious or communicable diseases) to be made to the local board of health, should be rigorously enforced, both as regards physicians and householders, because by its enforcement and by prompt and proper action on the part of local health authorities upon the information thus obtained, thousands of lives may be saved in every year in this State; and it may incidentally supply valuable statistics; but regarded as a means of securing valuable statistics, *under present conditions in this State,* the practice of asking from *all* physicians reports of all diseases cannot be too strongly condemned. From some localities where this has been attempted by the local health officer as a means of obtaining information on which to base reports to the State Board of Health, the least satisfactory reports have been received; and one object of this present writing is to generally discourage further attempts in that direction. It is not to be expected, nor is it desirable that every physician shall give the number of cases he treats to another physician in the immediate locality; many physicians dislike to do this; and unreliable doctors will often report a larger number of cases than they really treat in order to advertise themselves. This one fact would make the results unreliable and worthless, even if all physicians reported regularly relative to the number of cases, which is not probable, and if they did not report regularly, no satisfactory compilation could be made. It does not seem wise, at present, to ask of all physicians even the "order of prevalence" of all diseases, because a considerable proportion of those who call themselves doctors and who practice medicine in Michigan are uneducated persons who have not sufficient knowledge of the subject to make such reports. It should be remembered that there is no law in Michigan requiring any education or scientific knowledge by those who practice medicine. The fact that the plan of these weekly reports is well understood and intelligently carried out by many leading physicians throughout the State who act as regular correspondents of the State Board of Health, is no indication that the great number of uneducated doctors about the State would or could do equally well.

After over ten years' experience in compiling and studying vital statistics, and comparing these statistics of sickness with statistics of deaths in previous years and in the same years, the writer believes these statistics of sickness to be of very great value, that the number of observers is now sufficient to give good evidence so far as is required for a study of the subject for the entire State relative to most of those diseases which cause the most sickness in Michigan; and that by securing a few more observers to report for certain parts of the

State not now sufficiently represented to enable one to study the subject comparatively by divisions of the State and each part of the State by itself, the system will be well developed. As it now is the system is very satisfactory. So far as regards a study of the subject for the State as a whole, it yields very valuable evidence; and the value of such reports and compilations increases greatly by repetition, because thereby rules and general principles are established. The value increases each year because each year varies slightly in some particular, and opportunity is thus found to learn whether any disease varies coincidently, and how it varies, etc. Rapid progress is thus being made in our knowledge of the conditions under which many of the most fatal diseases prevail; and such knowledge is essential to correct action for the avoidance of those conditions, or for guarding against them when they cannot be avoided.

The following letter showing methods of securing reports, where previous articles on this subject are to be found, etc., will probably be of interest:—

[3.] [PRINTED LETTER.]

RELATIVE TO MAKING WEEKLY REPORTS OF DISEASES.

OFFICE OF THE SECRETARY OF THE STATE BOARD OF HEALTH,
LANSING, MICHIGAN, January, 1880.

To Regular Correspondents of the State Board of Health:

GENTLEMEN:—Permit me to ask your attention to articles relating to Weekly Reports of Diseases, on pages 251–309 of the Annual Report of the State Board of Health for 1877, and on pages 237–343 of the Report for 1878; also to an article relating to the Principal Meteorological Conditions in Michigan in 1877, on pages 211–250, of the Report for 1878—copies of which Reports have already been sent to you. Similar articles will appear in the Report for 1879, now being printed. These articles are based on reports made by the Meteorological Observers of the Board, by some of the Regular Correspondents of the Board, and by the Health Officers of certain cities in Michigan. It is believed that they are valuable articles, and it is hoped that you will find them of interest.

Aside from the work of compiling these reports, the making of the plan for the compilation has been a task of no slight difficulty. While it is not claimed that these compilations are as yet perfect in details, or even that the plan of making the reports is the best that can be devised, it is believed that the material here collected affords, to the careful student of the diseases of the State, valuable data for comparison with meteorological and other conditions. In view of the importance of collecting statistics concerning the diseases which destroy the health, strength, labor, and wealth of our people, it is hoped that you will give this product of the joint work of prominent physicians of the State, and of this Board, your careful attention; and if you choose to favor us with such suggestions as to the manner of collecting reports of diseases or of combining and presenting information thus obtained, as on reflection you may think desirable and practicable to be acted upon, such suggestions will be thankfully received.

In the hope of increasing the number and the value of the reports received for the current year, I have addressed you this printed letter for the purpose of asking,—

(1.) That you continue to send weekly reports of diseases in your locality, if you are now sending them;

(2.) Whether it will be possible for you to renew such reports, if for any reason they may have been discontinued; or,

(3.) If you have not heretofore sent such reports, whether you can now undertake the labor of making them, in accordance with the plan stated on pages 240–243 of the Fifth Annual Report (for 1877).

Should you consent to make these reports, postal blanks will be sent to you for that purpose at the beginning of each quarter, and it is intended that you shall be saved any expense for postage.

Will you have the kindness to inform me by the enclosed postal card, whether you will report for your locality, and whether you have postal blanks sufficient for the current quarter ending March 31, 1880?

Very respectfully,

HENRY B. BAKER,
Secretary.

EXHIBIT 22.—*Giving, by Months of the Year 1879 (ending Saturday, January 3, 1880), for the State, and for each of the Ten Geographical Divisions of Michigan from which Weekly Reports of Diseases were received, the Number of Observers from whom the Reports were received; the Number of Reports received; the Day on which, for the purposes of this compilation, each Month is made to end; and the Number of Weeks thus included in each Month.*

MONTHS, 1879.	MONTHS AND YEAR END SATURDAY.	Number of Weeks.	STATE.		DIVISIONS OF THE STATE.*																			
					1. UPPER PENINSULAR.*		2. NORTH-WESTERN.*		4. NORTH-EASTERN.*		5. WESTERN.*		6. NORTH'N CENT'L.*		7. BAY AND EASTERN.*		8. CENTRAL.*		9. SOUTH-WESTERN.*		10. SOUTHERN-CENTRAL.*		11. SOUTH-EASTERN.*	
			Observers.	Reports.†	Observers.	Reports.†	Observers.	Reports.†	Observers.	Reports.†	Observers.	Reports.†	Observers.	Reports.†	Observers.	Reports.†	Observers.	Reports.†	Observers.	Reports.†	Observers.	Reports.†	Observers.	Reports.†
YEAR 1879....‡	Jan. 3, 1880..	53	110	3,755	5	127	3	96	1	33	9	283	1	53	16	521	23	793	14	414	25	874	13	561
Av. per Month	....	..	73	313	3	11	2	8	§ 1	§ 4	6	24	1	4	10	43	15	66	8	35	17	73	11	47
January.......	Feb. 1, 1879..	5	64	319	3	15	2	10	1	5	5	25	1	5	9	45	12	59	6	30	15	75	10	50
February.......	March 1......	4	64	250	3	10	2	7	1	4	5	20	1	4	9	36	13	50	6	23	14	56	10	40
March..........	March 29.....	4	63	248	3	12	2	8	1	4	5	20	1	4	9	36	12	46	5	19	15	59	10	40
April...........	May 3.........	5	60	290	2	10	1	5	0	0	5	24	1	5	10	48	10	50	7	32	14	67	10	49
May............	May 31.......	4	72	268	2	8	1	4	0	0	5	20	1	4	9	33	17	59	8	29	18	67	11	44
June...........	June 28......	4	81	312	2	7	2	8	1	3	5	20	1	4	10	40	18	71	10	39	21	76	11	44
July............	Aug. 2........	5	82	395	2	9	2	10	1	5	5	25	1	5	11	49	19	92	11	51	18	90	12	59
August........	Aug. 30......	4	83	322	2	7	2	8	1	4	7	27	1	4	12	45	18	71	10	38	18	71	12	47
September....	Sept. 27......	4	81	319	3	12	2	8	1	4	6	23	1	4	12	46	17	68	10	38	18	72	11	44
October	Nov. 1........	5	79	381	3	14	2	10	1	4	6	28	1	5	12	56	17	84	8	40	18	87	11	53
November....	Nov. 29......	4	73	284	2	8	2	8	0	0	6	22	1	4	10	39	16	64	8	32	18	69	10	38
December.....	Jan. 3, 1880..	5	75	367	3	15	2	10	0	0	6	29	1	5	10	48	16	79	9	43	17	85	11	53

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* For counties in each division, see Exhibit 1, page 227. † From some of the observers reports were not received for every week, so that the number of reports received does not equal the number of observers multiplied by the number of weeks in the given month or in the year.

‡ In some localities there were more observers than one. The whole number of localities from which reports were received was 81; the average number per month was 62. The number of cards received from each observer for each month and for the year is stated in Exhibit 23, pages 384–5.

§ Average for 8 months.

TABLE 1.—WEEKLY REPORTS OF DISEASES IN MICHIGAN IN 1879,—*Exhib-*
Per Cent of Observers in Michigan, in each Month, who reported the Presence of each
respondents of the State Board of Health for 1879, from 3,755 Reports by 110 Health*
Correspondents; and for 1877, from 3,320 Reports by 115 Health Officers and Corres-
reporting them present in 1879.

PER CENT OF OBSERVERS BY WHOM EACH

JANUARY.*

DISEASES.	1879.	1878.	1877.
Average	47	41	40
Bronchitis	94	84	85
Rheumatism	94	88	82
Pneumonia	91	71	88
Influenza	86	66	73
Consumption, Pulmon'y	80	77	66
Intermittent Fever	80	86	69
Tonsilitis	77	..	..
Neuralgia	67	..	..
Scarlatina	61	34	43
Diphtheria	55	51	51
Remittent Fever	53	73	52
Erysipelas	45	47	49
Whooping cough	39	19	34
Croup, Membraneous	38	22	33
Diarrhea	36	40	43
Typho-malarial Fever	22	34	24
Measles	14	5	12
Puerperal Fever	13	12	16
Dysentery	11	16	12
Typhoid Fever	9	19	21
Cerebro-spin. Meningitis	5	7	3
Cholera Morbus	5	7	10
Cholera Infantum	5	5	3
Small-pox	0	0	10

FEBRUARY.*

DISEASES.	1879.	1878.	1877.
Average	44	40	38
Bronchitis	92	82	89
Pneumonia	89	75	86
Rheumatism	89	82	86
Influenza	88	62	76
Tonsilitis	80	..	..
Consumption, Pulmon'y	78	79	52
Intermittent Fever	78	83	69
Neuralgia	75	..	..
Diphtheria	52	39	38
Remittent Fever	47	65	51
Erysipelas	47	39	41
Scarlatina	44	51	38
Diarrhea	34	45	38
Whooping-cough	33	18	32
Croup, Membraneous	23	14	21
Typho-malarial Fever	20	24	18
Measles	11	7	10
Dysentery	9	10	13
Cholera Morbus	9	18	3
Puerperal Fever	8	8	7
Typhoid Fever	6	15	15
Cerebro-spin. Meningitis	5	7	8
Cholera Infantum	5	6	0
Small-pox	0	0	6

MARCH.*

DISEASES.	1879.	1878.	1877.
Average	46	39	36
Pneumonia	90	73	81
Bronchitis	87	84	90
Rheumatism	87	88	79
Influenza	83	62	72
Intermittent Fever	83	85	71
Neuralgia	81	..	..
Tonsilitis	81	..	..
Consumption, Pulmon'y	75	81	59
Remittent Fever	52	67	59
Scarlatina	52	52	34
Erysipelas	51	32	40
Diphtheria	43	38	35
Diarrhea	35	49	37
Whooping-cough	30	15	29
Croup, Membraneous	22	14	22
Typho-malarial Fever	19	26	21
Measles	14	5	16
Dysentery	14	21	12
Puerperal Fever	13	8	19
Typhoid Fever	11	11	9
Cholera Morbus	10	14	6
Cerebro-spin. Meningitis	8	5	6
Cholera Infantum	8	8	1
Small-pox	0	0	4

JULY.*

DISEASES.	1879.	1878.	1877.
Average	46	40	36
Intermittent Fever	96	93	93
Diarrhea	96	86	89
Cholera Morbus	82	63	67
Remittent Fever	80	80	69
Rheumatism	80	73	58
Consumption, Pulmon'y	77	71	53
Neuralgia	76	..	..
Cholera Infantum	56	46	38
Dysentery	56	51	55
Bronchitis	55	63	37
Erysipelas	54	27	25
Tonsilitis	48	..	..
Pneumonia	39	39	24
Diphtheria	38	22	18
Influenza	35	42	35
Whooping-cough	33	27	35
Scarlatina	29	25	29
Typho-malarial Fever	28	31	31
Measles	26	10	16
Typhoid Fever	12	10	7
Puerperal Fever	9	3	2
Cerebro-spin. Meningitis	5	3	2
Small-pox	2	5	7
Croup	1	2	2

AUGUST.*

DISEASES.	1879.	1878.	1877.
Average	48	41	40
Diarrhea	99	94	96
Intermittent Fever	95	94	95
Remittent Fever	90	80	82
Cholera Morbus	87	59	77
Dysentery	78	71	91
Consumption, Pulmon'y	75	71	41
Cholera Infantum	71	62	63
Rheumatism	69	65	57
Neuralgia	67	..	..
Bronchitis	53	56	34
Tonsilitis	49	..	..
Typho-malarial Fever	42	39	43
Diphtheria	41	23	14
Erysipelas	34	33	23
Influenza	33	38	27
Whooping-cough	27	30	34
Pneumonia	23	26	23
Typhoid Fever	23	18	25
Scarlatina	23	27	23
Measles	8	8	11
Cerebro-spin. Meningitis	7	3	5
Croup, Membraneous	5	2	5
Puerperal Fever	2	6	7
Small-pox	0	2	5

SEPTEMBER.*

DISEASES.	1879.	1878.	1877.
Average	49	45	40
Intermittent Fever	96	94	93
Diarrhea	96	98	97
Remittent Fever	79	84	80
Rheumatism	78	73	67
Consumption, Pulmon'y	73	76	42
Neuralgia	68	..	..
Cholera Morbus	64	56	58
Bronchitis	63	65	48
Dysentery	62	73	82
Typho-malarial Fever	57	60	63
Cholera Infantum	57	60	45
Tonsilitis	53	..	..
Influenza	48	51	35
Pneumonia	42	25	25
Diphtheria	36	27	22
Whooping-cough	32	32	23
Erysipelas	32	29	18
Typhoid Fever	31	22	38
Scarlatina	25	35	22
Measles	14	3	5
Puerperal Fever	9	5	7
Croup, Membraneous	9	5	10
Cerebro-spin. Meningitis	2	6	7
Small-pox	0	2	5

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* For 1879 the number of observers, reports, weeks in each month, etc., are stated in the first five
from each are stated in Exhibit 23, pages 384-5.

iting by Months of the Three Years ending January 3. 1880, for each of 24 Diseases, the
Disease.—Compiled from Weekly Reports by Health Officers of Cities and Regular Cor-
Officers and Correspondents; for 1878, from 3,221 Reports by 97 Health Officers and
pondents. Diseases arranged by Months in order of Greatest Number of Observers

DISEASE WAS REPORTED PRESENT, IN—

APRIL.*

Diseases.	1879.	1878.	1877.
Average	46	38	36
Rheumatism	95	87	75
Intermittent Fever	92	92	81
Bronchitis	88	79	80
Consumption, Pulmon'y	82	79	63
Pneumonia	82	73	72
Influenza	78	63	59
Neuralgia	78	..	..
Tonsilitis	78	..	..
Remittent Fever	62	62	58
Erysipelas	50	30	50
Diarrhea	48	40	33
Scarlatina	47	32	38
Diphtheria	42	38	31
Whooping-cough	27	17	23
Measles	23	5	22
Croup, Membraneous	22	16	13
Typho-malarial Fever	17	29	19
Typhoid Fever	12	10	16
Cholera Morbus	12	13	9
Dysentery	10	14	16
Cerebro-spin. Meningitis	10	3	6
Puerperal Fever	7	2	11
Cholera Infantum	5	5	3
Small-pox	0	0	8

MAY.*

Diseases.	1879.	1878.	1877.
Average	41	39	38
Intermittent Fever	96	97	93
Rheumatism	90	80	83
Consumption, Pulmon'y	88	80	63
Bronchitis	78	78	70
Tonsilitis	71	..	..
Neuralgia	69	..	..
Remittent Fever	68	65	72
Pneumonia	67	68	57
Influenza	53	62	57
Erysipelas	51	37	50
Diarrhea	49	45	53
Diphtheria	36	27	15
Scarlatina	33	33	33
Measles	29	8	27
Whooping cough	24	27	33
Cholera Morbus	18	13	23
Typho-malarial Fever	15	23	20
Croup, Membraneous	14	10	8
Dysentery	11	23	23
Typhoid Fever	7	10	13
Puerperal Fever	7	8	10
Cholera Infantum	1	7	7
Cerebro-spin. Meningitis	1	10	7
Small-pox	1	0	10

JUNE.*

Diseases.	1879.	1878.	1877.
Average	41	35	34
Intermittent Fever	96	93	96
Rheumatism	86	82	70
Consumption, Pulmon'y	78	70	61
Neuralgia	77	..	..
Remittent Fever	74	70	67
Bronchitis	68	66	46
Tonsilitis	64	..	..
Diarrhea	63	48	56
Erysipelas	49	26	33
Pneumonia	47	56	32
Influenza	43	48	33
Diphtheria	35	23	18
Cholera Morbus	33	30	32
Measles	32	7	19
Scarlatina	28	28	37
Whooping-cough	25	25	32
Typho-malarial Fever	21	25	21
Dysentery	16	26	28
Cholera Infantum	12	18	26
Typhoid Fever	6	11	11
Puerperal Fever	6	5	9
Croup, Membraneous	6	10	5
Small-pox	4	2	5
Cerebro-spin. Meningitis	4	5	11

OCTOBER.*

Diseases.	1879.	1878.	1877.
Average	49	47	44
Intermittent Fever	91	97	93
Rheumatism	89	82	84
Diarrhea	86	66	82
Neuralgia	82	..	..
Remittent Fever	80	84	85
Consumption, Pulmon'y	78	79	71
Bronchitis	75	79	70
Tonsilitis	72	..	..
Typho-malarial Fever	57	70	72
Diphtheria	57	46	44
Influenza	42	59	55
Dysentery	41	43	56
Cholera Morbus	38	18	30
Pneumonia	37	49	43
Typhoid Fever	35	31	35
Scarlatina	35	44	34
Whooping-cough	32	44	26
Erysipelas	30	43	32
Cholera Infantum	19	26	23
Puerperal Fever	11	5	10
Croup, Membraneous	11	16	12
Measles	10	3	1
Cerebro-spin. Meningitis	6	8	10
Small-pox	0	0	4

NOVEMBER.*

Diseases.	1879.	1878.	1877.
Average	44	39	40
Intermittent Fever	86	92	88
Rheumatism	84	80	89
Neuralgia	78	..	..
Bronchitis	75	79	87
Consumption, Pulmon'y	74	75	75
Tonsilitis	70	..	..
Remittent Fever	64	74	75
Pneumonia	62	59	57
Diarrhea	59	43	58
Diphtheria	55	49	46
Influenza	49	62	55
Typho-malarial Fever	42	39	55
Erysipelas	36	38	26
Whooping-cough	34	43	22
Scarlatina	32	39	37
Typhoid Fever	30	15	38
Dysentery	23	13	22
Croup, Membraneous	19	28	16
Measles	12	8	4
Cholera Infantum	10	3	8
Cholera Morbus	8	7	16
Puerperal Fever	8	8	11
Small-pox	1	2	1
Cerebro-spin. Meningitis	0	5	3

DECEMBER.*

Diseases.	1879.	1878.	1877.
Average	46	41	39
Bronchitis	92	85	91
Rheumatism	82	87	86
Intermittent Fever	81	80	82
Neuralgia	80	..	..
Tonsilitis	80	..	..
Consumption, Pulmon'y	76	77	73
Pneumonia	75	77	71
Influenza	68	67	59
Remittent Fever	67	54	72
Diphtheria	60	54	41
Diarrhea	49	36	33
Whooping-cough	39	41	21
Erysipelas	39	34	27
Scarlatina	37	51	26
Typho-malarial Fever	35	28	44
Croup, Membraneous	32	25	19
Typhoid Fever	31	16	28
Dysentery	23	11	15
Measles	20	10	5
Cholera Morbus	11	8	9
Puerperal Fever	7	3	5
Cholera Infantum	5	2	4
Cerebro-spin. Meningitis	5	5	8
Small-pox	3	0	0

columns of Exhibit 22, page 371; the names of the observers and the number of reports received

TABLE 2.—WEEKLY REPORTS OF DISEASES IN MICHIGAN IN 1879.—*Exhibiting for the Year, and for each Month of the Year, ending Saturday, January 3, 1880, a Summary relative to Diseases in the State of Michigan; also for each Month a Summary relative to Diseases in each of 10 Geographical Divisions* of the State,—Indicating (for the State) the Prevalence as regards both Time and Area, and also the Comparative Severity of the Diseases.—Compiled from 3,755 Weekly Reports by 110 Health Officers of Cities and Regular Correspondents of the State Board of Health.*

	NUMBER OF OBSERVERS, REPORTS, ETC.	DISEASES.	Per Cent of Observers Reporting Presence of. b	Av. Per Ct. of Weeks Reported Present Where Present. c	Per Cent of Reports Stating Presence of. d	Av. Order of Prevalence Where Present. e	Times Reported More than Usually Severe.	Times Reported Usually Severe.	Times Reported Less than Usually Severe.	Difference between "Times Reported More" and "Times Reported Less" than Usually Severe. f	Av. Times per Month Reported More than Usually Severe.	Av. Times per Month Reported Usually Severe.	Av. Times per Month Reported Less than Usually Severe.	Av. Difference between "Times More" and "Times Less" Severe. f
For the Year 1879 (Ending January 3, 1880.)†		Average for Tabulated Diseases Reported Present	44	74	33	4.7	109.4	700.2	268.5	-159.1	9.1	58.4	22.4	-13.3
	Whole No. of Localities represented, 81. g	Bronchitis	75	84	64	3.6	173	1432	510	-337	14.4	119.3	42.5	-28.1
		Cerebro-spinal Meningitis	5	45	2	7.4	11	47	31	-20	1.0	4.3	2.8	-1.8
		Cholera Infantum	23	60	14	5.4	67	253	127	-60	5.6	21.1	10.6	-5.0
		Cholera Morbus	34	58	19	5.3	67	402	139	-72	5.6	33.5	11.6	-6.0
	Av. No. of Localities represented per month, 62. g	Consumption, Pulmonary	78	90	70	5.6	89	1948	157	-68	7.4	162.3	13.1	-5.7
		Croup, Membraneous	16	40	7	6.6	37	145	55	-18	3.1	12.1	4.6	-1.5
		Diphtheria	45	63	29	5.4	170	509	387	-217	14.2	42.4	32.3	-18.1
	Whole No. of Observers during the year, 110.	Diarrhea	65	74	48	4.4	121	874	444	-323	10.1	72.8	37.0	-26.9
		Dysentery	31	57	18	6.2	59	333	229	-170	4.9	27.8	19.1	-14.2
		Erysipelas	43	58	25	6.5	51	496	250	-199	4.3	41.3	20.8	-16.6
	Av. No. of Observers per month, 73.	Fever, Intermittent	90	91	82	2.2	298	1697	671	-373	24.8	141.4	55.9	-31.1
		Fever, Remittent	69	82	57	3.3	184	1129	525	-341	15.3	94.1	43.8	-28.4
		Fever, Typhoid (Enteric)	18	63	12	7.0	57	203	112	-55	4.8	16.9	9.3	-4.6
	Total No. of Reports Compiled, 3,755. a	Fever, Typho-malarial	32	67	22	5.8	63	484	165	-102	5.3	40.3	13.8	-8.5
		Influenza	57	78	45	3.1	230	967	326	-96	19.2	80.6	27.2	-8.0
		Measles	18	68	12	4.7	46	265	112	-66	3.8	22.1	9.3	-5.5
		Neuralgia	75	78	59	4.5	213	1357	359	-146	17.8	113.1	29.9	-12.2

Av. No. of Reports per month, 313.	Pneumonia	60	69	41	5.2	133	876	352	-219	11.1	73.0	29.3	-18.3
	Puerperal Fever	8	40	3	7.2	23	64	30	-7	1.9	5.3	2.5	-0.6
	Rheumatism	85	84	72	4.6	207	1480	647	-440	17.3	123.3	53.9	-36.7
	Scarlatina	36	64	23	5.5	92	370	284	-192	7.7	30.8	23.7	-16.0
	Small-pox	1	38	0.4	10.6	1	6	7	-6	0.2	1.2	1.4	-1.2
	Tonsilitis	68	67	45	4.5	168	987	323	-155	14.0	82.3	26.9	-12.9
	Whooping-cough	31	72	23	5.5	65	481	201	-136	5.4	40.1	16.8	-11.3

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* For Counties in each Division, see Exhibit 1, page 227.

† For Number of Observers, Reports, Weeks in each Month, etc., see Exhibit 22, page 371; for Names of Observers and number of reports received from each, see Exhibit 23, pages 384-5.

[a] Not every one of the observers sent in a report for every week, so that the number of reports received does not equal the number of observers multiplied by the number of weeks.

[b] Indicates the Area of Prevalence, except that in a few instances there were two or more observers in one city or village.

[c] This column gives the per cent which the number of reports stating presence of a disease is of the number of card-reports *received* from such of the observers as reported the disease present. It is, therefore, an average not for all localities represented, but only for those at which the given disease was reported present. In the line "Average for Tabulated Diseases," it gives the per cent which the number of times *all* diseases are reported present is of the number of times they *might have been* so reported on the cards received, for the time specified, from the observers who reported the diseases present at all. It will be seen that this is a more accurate average than would be obtained by dividing the sum of the column by the number of diseases reported present.

[d] This column gives the per cent which the number of reports stating presence of a disease is of the whole number of reports received for the time specified, from *all observers* in the State or division, as the case may be. It combines and states, in a general way, an idea of the *time* a disease was prevalent, with an idea of the area of its prevalence. Had every observer sent a report every week of the month or year, the numbers in this column would be (for the State) the product of the numbers in the same line in the two preceding columns.

[e] The disease having the greatest number of cases was to be marked 1 in the order; the disease having the next greatest number of cases, 2; and so on. Diseases not present were to be marked 0. The numbers in this column are found by dividing the totals (for the State) of the Order of Prevalence columns, in Table 3, (pages 386-433,) by the number of men who reported the disease present. The column is, therefore, an average not for all the localities represented, but only for those at which the given disease was reported present. The "Average for Tabulated Diseases" is found by dividing the sum of the totals in the Order of Prevalence columns, in Table 3, for all diseases reported present, by the sum of the numbers of men who reported the different diseases present, thus counting each man once for every disease he reported present. As a rule, small numbers in this column indicate a large prevalence of the disease, and *vice versa*.

[f] The + sign indicates that the times reported "more" exceed those reported "less" than usually severe; the - sign, that the times reported "less" exceed those reported "more" than usually severe, the number of times by which either exceeds the other being indicated by the numbers stated.

[g] In this statement Ionia and the State House of Correction at Ionia, and Jackson and the State Prison at Jackson are counted as separate localities.

For 1879 statements concerning the severity of diseases reported were made on a larger proportion of reports than for previous years. When all the observers can take the trouble to fill out the blanks for statements concerning the severity of the diseases they report, a more valuable summary can be deduced from these statements.

TABLE 2.—CONTINUED.—*Diseases in the State,—January to June, 1879.* (*For foot-notes and full tabular heads, see pages 374–5.*)

MONTHS.†	DISEASES.	Per ct. of Observers Reporting Pres. of.*b*	Av. per ct. of Weeks Reported Present where Present.*a, c*	Per cent of Reports Stating Pres'nce of.*d*	Av. Order of Prevalence where Pres.*e*	Times Rep'ted More than usually Severe.	Times Reported Usually Severe.	Times Reported Less than usually Severe.	Difference between Times "More" and "Less" Severe.*f*	MONTHS.†	Per ct. of Observers Reporting Pres. of.*b*	Av. per ct. of Weeks Reported Present where Present.*a, c*	Per cent of Reports Stating Pres'nce of.*d*	Av. Order of Prevalence where Pres.*e*	Times Rep'ted More than usually Severe.	Times Reported Usually Severe.	Times Reported Less than usually Severe.	Difference between Times "More" and "Less" Severe.*f*	MONTHS.†	Per ct. of Observers Reporting Pres. of.*b*	Av. per ct. of Weeks Reported Present where Present.*a, c*	Per cent of Reports Stating Pres'nce of.*d*	Av. Order of Prevalence where Pres.*e*	Times Rep'ted More than usually Severe.	Times Reported Usually Severe.	Times Reported Less than usually Severe.	Difference between Times "More" and "Less" Severe.*f*
JANUARY.†	AVERAGE FOR TABULATED DISEASES REPORTED PRESENT	47	74	35	4.7	14.1	60.1	23.0	-8.9	FEBRUARY.†	44	80	36	4.8	9.0	50.4	18 0	-9.1	MARCH.†	46	78	36	4.9	7.4	52.5	17.9	-10.4
	Bronchitis	94	88	83	2.6	40	170	32	+8		92	94	87	2.4	22	130	29	-7		87	95	83	2.5	17	129	32	-15
	Cerebro-spinal Meningitis	5	67	3	8.3	0	8	2	-2		5	75	4	8.3	0	6	3	-3		8	70	6	10.2	0	8	6	-6
	Cholera Infantum	5	47	2	7.3	0	3	4	-4		5	55	2	7.0	0	2	3	-3		8	45	4	6.4	0	4	5	-5
	Cholera Morbus	5	64	3	7.6	2	2	0	+2		9	41	.4	7.2	0	7	3	-3		10	38	4	9.5	0	7	1	-1
	Consumption, Pulmonary	80	90	71	5.7	7	170	2	+5		78	91	71	5.9	6	124	14	-8		75	91	69	6.0	4	124	11	-7
	Croup, Membraneous	38	44	16	7.0	7	29	9	-2		23	45	10	7.3	3	18	9	-6		22	39	9	7.1	1	13	4	-3
	Diphtheria	55	72	39	5.3	26	54	42	-16		52	69	36	6.1	10	37	39	-29		43	60	26	6.4	10	24	25	-15
	Diarrhea	36	54	20	6.8	1	25	21	-20		34	61	21	6.5	0	28	18	-18		35	70	25	7.1	1	40	10	-9
	Dysentery	11	46	5	9.3	0	14	11	-11		9	50	5	8.8	0	7	4	-4		14	39	6	8.4	1	12	4	-3
	Erysipelas	45	69	31	6.8	9	42	28	-19		47	59	28	7.3	0	42	18	-18		51	64	33	6.4	3	47	22	-19
	Fever, Intermittent	80	80	63	3.4	16	105	54	-38		78	87	69	3.9	14	93	37	-23		83	88	73	3.5	14	108	38	-24
	Fever, Remittent	53	72	38	4.9	10	47	49	-39		47	81	38	4.9	4	48	31	-27		52	77	40	4.6	6	56	29	-23
	Fever, Typhoid (Enteric)	9	60	6	8.2	0	11	11	-11		6	75	5	9.8	1	5	6	-5		11	54	6	6.7	3	8	4	-1
	Fever, Typho-malarial	22	71	16	7.3	1	20	18	-17		20	67	14	7.2	3	18	9	-6		19	65	13	8.0	6	16	5	+1
	Influenza	86	81	70	2.1	56	115	29	+27		88	93	81	1.9	54	106	17	+37		83	92	76	1.9	24	106	33	-9
	Measles	14	62	9	5.2	1	18	7	-6		11	70	8	5.9	3	11	3	0		14	56	8	5.0	2	15	1	+1
	Neuralgia	67	73	49	4.9	32	101	8	+24		75	79	59	4.5	12	101	17	-5		81	83	68	4.5	14	107	24	-10
	Pneumonia	91	76	69	4.7	20	127	45	-25		89	91	80	4.3	21	111	38	-17		90	82	71	4.4	17	100	39	-22
	Puerperal Fever	13	44	5	7.0	4	9	----	+4		8	50	4	11.0	6	4	0	+6		13	50	6	9.9	3	8	4	-1
	Rheumatism	94	86	80	4.3	27	146	56	-29		89	88	78	4.5	14	116	43	-29		87	90	79	4.4	23	118	36	-13
	Scarlatina	61	58	35	5.4	15	31	44	-29		44	67	29	5.5	7	25	28	-21		52	65	36	5.6	13	38	28	-15

	Small-pox	0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Tonsilitis	77	70	54	3.9	36	95	23	+13		80	75	60	4.1	24	87	18	+6		81	74	60	4.5	9	95	24	-15
	Whooping-cough	39	77	30	5.1	15	41	35	-20		33	83	28	5.3	2	33	28	-26		30	74	23	5 2	0	24	26	-26
APRIL.†	AVERAGE FOR TABULATED DISEASES REPORTED PRESENT	46	75	35	4.6	7.6	60.7	23.6	-16.0	MAY.†	41	74	30	4.4	5.6	46.2	19.3	-13.7	JUNE.†	41	73	30	4.3	5.7	52.8	21.6	-15.9
	Bronchitis	88	87	78	2.8	16	145	47	-31		78	84	65	3.6	3	90	57	-54		68	79	54	3.9	3	98	43	-40
	Cerebro-spinal Meningitis	10	41	4	6.7	1	6	5	-4		1	25	0.4	3.0	1	0	0	+1		4	25	1	4.3	1	2	1	0
	Cholera Infantum	5	40	2	8.3	0	1	4	-4		1	33	0.4	10.0	0	0	1	-1		12	38	5	6.1	1	8	3	-2
	Cholera Morbus	12	41	5	6.7	0	9	3	-3		18	45	8	6.6	0	12	7	-7		33	45	15	5.9	1	27	10	-9
	Consumption, Pulmonary	82	94	77	5.5	9	182	8	+1		88	85	74	5.2	8	141	11	-3		78	93	73	5.0	6	170	21	-15
	Croup, Membraneous	22	46	10	6.2	1	17	8	-7		14	38	5	6.4	2	8	6	-4		6	30	2	5.4	0	4	2	-2
	Diphtheria	42	63	22	6.1	3	34	25	-22		36	56	20	5.5	9	24	22	-13		35	55	20	4.4	6	27	34	-28
	Diarrhea	48	61	30	6.6	1	46	25	-24		49	66	31	6.0	0	35	27	-27		63	69	44	4.7	6	62	29	-23
	Dysentery	10	73	8	9.8	0	16	6	-6		11	50	6	9.1	1	6	8	-7		16	47	8	6.9	1	15	6	-5
	Erysipelas	50	60	31	6.5	2	55	27	-25		51	66	33	5.6	11	45	19	-8		49	58	29	5.6	4	53	21	-17
	Fever, Intermittent	92	88	81	2.6	21	124	71	-50		96	93	89	1.9	21	134	56	-35		96	94	90	1.4	31	153	59	-28
	Fever, Remittent	62	82	51	4.1	12	67	56	-44		68	83	57	3.2	5	89	40	-35		74	84	63	3.1	17	101	51	-34
	Fever, Typhoid (Enteric)	12	63	8	8.4	4	6	8	-4		7	40	3	7.6	0	1	4	-4		6	78	4	7.4	0	8	5	-5
	Fever, Typho-malarial	17	50	9	7.1	0	19	4	-4		15	62	9	7.3	0	15	4	-4		21	59	13	6.8	2	27	7	-5
	Influenza	78	84	66	2.4	24	93	62	-38		53	77	41	3.2	6	60	38	-32		43	69	29	4.0	4	60	19	-15
	Measles	23	58	13	4.4	3	25	6	-3		29	77	22	3.2	8	35	11	-3		32	68	23	3.7	3	42	21	-18
	Neuralgia	78	82	65	4.5	17	130	22	-5		69	81	55	4.1	17	102	18	-1		77	76	59	4.1	14	107	29	-15
	Pneumonia	82	76	62	4.5	17	113	34	-17		67	61	40	5.4	10	68	24	-14		47	55	26	6.1	----	54	20	-20
	Puerperal Fever	7	47	3	7.8	2	3	5	-3		7	30	2	7.6	1	2	0	+1		6	33	2	4.6	1	3	3	-2
	Rheumatism	95	84	81	4.0	23	141	48	-25		90	83	75	4.2	12	118	46	-34		86	83	71	4.1	10	119	64	-54
	Scarlatina	47	66	31	5.1	10	37	28	-18		33	78	25	4.3	7	29	26	-19		28	62	17	4.4	7	24	19	-12
	Small-pox	0	0	0	0	0	0	0	0		1	25	0.4	5.0	0	1	0	0		4	42	2	6.3	0	2	2	-2
	Tonsilitis	78	67	52	4.6	8	93	23	-15		71	63	44	4.2	12	63	32	-20		64	66	43	4.4	10	71	30	-20
	Whooping-cough	27	68	19	6.1	----	34	18	-18		24	70	16	6.4	1	27	7	-6		25	77	20	4.7	9	30	19	-10

TABLE 2.—CONTINUED.—*Diseases in the State,—July to December, 1879.* (*For foot-notes and full tabular heads, see pages 374–5.*)

MONTHS.†	DISEASES.	Per ct. of Observers Reporting Pres. of b	Av. per ct. of Weeks Reported Present where Present.a, c	Per cent of Reports Stating Pres'nce of.d	Av. Order of Prevalence where Pres.e	Times Rep'ted More than usually Severe.	Times Reported Usually Severe.	Times Reported Less than usually Severe.	Difference between Times "More" and "Less" Severe.f	MONTHS.†	Per ct. of Observers Reporting Pres. of.b	Av. per ct. of Weeks Reported Present where Present.a, c	Per cent of Reports Stating Pres'nce of.d	Av. Order of Prevalence where Pres.e	Times Rep'ted More than usually Severe.	Times Reported Usually Severe.	Times Reported Less than usually Severe.	Difference between Times "More" and "Less" Severe.f	MONTHS.†	Per ct. of Observers Reporting Pres. of.b	Av. per ct. of Weeks Reported Present where Present.a, c	Per cent of Reports Stating Pres'nce of.d	Av. Order of Prevalence where Pres.e	Times Rep'ted More than usually Severe.	Times Reported Usually Severe.	Times Reported Less than usually Severe.	Difference between Times "More" and "Less" Severe.f
JULY.†	AVERAGE FOR TABULATED DISEASES REPORTED PRESENT	46	69	32	4.7	10.8	71.1	26.2	-15.4	AUGUST.†	48	78	37	5.0	11.5	70.2	25.7	-14.1	SEPTEMBER.†	49	74	36	4.7	10.8	65.0	24.0	-13.2
	Bronchitis	55	72	40	5.0	5	84	47	-42		53	75	41	5.4	3	83	37	-34		63	78	50	4.4	10	90	43	-33
	Cerebro-spinal Meningitis	5	40	2	7.5	2	3	3	-1		7	42	3	6.8	3	4	2	+1		2	25	1	12.0	1	0	2	-1
	Cholera Infantum	56	62	35	4.8	21	71	28	-7		71	79	57	5.3	26	98	39	-13		57	55	31	5.7	16	42	24	-8
	Cholera Morbus	82	61	50	4.6	23	114	33	-10		87	77	67	4.8	23	128	38	-15		64	60	38	5 5	12	61	21	-9
	Consumption, Pulmonary	77	90	69	5.6	2	196	23	-21		75	89	67	6.2	4	158	14	-10		73	91	67	6.0	9	165	9	0
	Croup, Membranous	1	20	0.3	4.0	0	1	1	-1		5	25	1	5.0	1	4	2	-1		9	33	3	5.4	5	4	1	+4
	Diphtheria	38	48	18	5.1	8	49	31	-23		41	58	24	6.3	14	46	28	-14		36	63	23	5.8	13	45	29	-16
	Diarrhea	96	80	77	3.1	38	140	55	-17		99	94	93	2.5	35	159	55	-20		96	86	83	3.2	13	123	73	-60
	Dysentery	56	51	28	5.4	15	48	30	-15		78	74	58	4.9	20	102	48	-28		62	64	40	5.1	9	53	45	-36
	Erysipelas	54	49	27	6.4	6	51	30	-24		34	62	21	6.9	5	36	16	-11		32	52	17	7.1	1	30	14	-13
	Fever, Intermittent	96	97	93	1.5	42	214	51	-9		95	96	92	1.8	39	166	54	-15		96	97	93	1.7	36	178	40	-4
	Fever, Remittent	80	87	70	3.0	29	152	49	-20		90	86	78	3.0	30	150	43	-13		79	85	67	2.5	33	116	30	+3
	Fever, Typhoid (Enteric)	12	40	5	8.2	2	8	6	-4		23	61	14	7.5	5	25	14	-9		31	63	20	6.7	8	30	12	-4
	Fever, Typho-malarial	28	56	16	6.3	4	42	15	-11		42	72	31	5.7	3	65	22	-19		57	73	42	4.7	13	77	24	-11
	Influenza	35	65	23	5.2	6	51	22	-16		33	68	23	5.9	6	47	15	-9		48	68	33	3.8	13	60	25	-12
	Measles	26	60	16	4.4	5	26	19	-14		8	79	7	7.1	0	14	8	-8		14	67	9	7.3	2	17	10	-8
	Neuralgia	76	69	52	5.0	12	133	31	-19		67	77	52	5.4	12	88	46	-34		68	81	56	5.0	14	109	32	-18
	Pneumonia	39	47	19	6.3	3	39	24	-21		23	64	15	8.1	7	21	16	-9		42	54	23	6.3	7	41	19	-12
	Puerperal Fever	9	29	3	5.1	1	9	0	+1		2	25	1	14.0	0	2	1	-1		9	46	4	6.0	2	9	3	-1
	Rheumatism	80	81	65	5.0	13	137	56	-43		69	82	57	5.8	10	106	46	-36		78	84	66	5.2	13	105	58	-45
	Scarlatina	29	59	17	5.6	9	25	26	-17		23	55	13	7.6	4	23	15	-11		25	58	14	6.3	4	28	10	-6

	Small-pox	2	44	1	6.0	0	2	2	-2		0	0	0	0	0	0	0	0		0	0	0	0	0	0	0	0
	Tonsilitis	48	58	28	5.3	7	59	29	-22		49	56	28	5.7	8	47	22	-14		53	60	32	5.4	9	65	19	-10
	Whooping-cough	33	60	21	5.8	6	52	18	-12		27	74	20	6.5	7	42	9	-2		32	79	26	5.0	6	48	10	-4
October.†	Average for Tabulated Diseases Reported Present	49	71	34	4.5	10.7	71.2	30.0	-19.3	November.†	44	77	34	4.6	7.3	52.2	19.9	-12.5	December.†	46	71	33	4.7	11.8	66.0	25.9	14.2
	Bronchitis	75	79	59	4.0	10	133	59	-49		75	86	65	3.6	19	114	31	-12		92	84	77	3.4	25	166	53	-28
	Cerebro-spinal Meningitis	6	40	3	4.8	2	9	4	-2		0	0	0	0	0	0	0	0		5	26	1	8.8	0	1	3	-3
	Cholera Infantum	19	45	8	4.8	2	14	12	-10		10	46	4	4.1	0	7	3	-3		5	25	1	4.5	1	3	1	0
	Cholera Morbus	38	39	15	5.5	3	21	18	-15		8	50	4	4.7	1	6	3	-2		11	36	4	5.1	2	8	2	0
	Consumption, Pulmonary	78	88	69	5.4	12	193	20	-8		74	90	67	5.4	9	142	13	-4		76	85	64	5.8	13	183	11	+2
	Croup, Membraneous	11	30	3	6.6	3	11	0	+3		19	39	7	6.5	8	12	3	+5		32	44	14	6.9	6	24	10	-4
	Diphtheria	57	59	34	5.0	25	46	32	-7		55	81	41	4.4	24	54	31	-7		60	70	42	5.2	22	69	49	-27
	Diarrhea	86	67	58	3.9	11	106	70	-59		59	66	40	5.5	9	53	27	-18		49	61	30	5.8	6	57	31	-28
	Dysentery	41	50	20	6.1	7	22	41	-34		23	58	14	7.4	1	21	16	-15		23	40	9	8.4	4	17	10	-6
	Erysipelas	30	54	16	7.2	2	35	18	-16		36	53	19	7.0	5	26	18	-13		39	50	19	6.5	3	34	19	-16
	Fever, Intermittent	91	97	88	1.6	39	185	66	-27		86	90	78	2.4	13	111	69	-56		81	81	66	2.8	12	126	76	-64
	Fever, Remittent	80	82	65	2.6	22	140	43	-21		64	81	52	2.9	4	82	43	-39		67	73	49	3.8	12	81	61	-49
	Fever, Typhoid (Enteric)	35	68	24	6.1	17	36	18	-1		30	80	25	6.0	8	33	13	-5		31	55	17	7.2	9	32	11	-2
	Fever, Typho-malarial	57	71	40	4.5	18	88	27	-9		42	74	32	5.3	6	56	16	-10		35	59	20	5.6	7	41	14	-7
	Influenza	42	72	30	4.0	4	72	23	-19		49	76	38	3.7	3	81	16	-13		68	76	51	2.7	30	116	27	+3
	Measles	10	87	8	6.8	4	20	8	-4		12	81	10	4.0	9	14	5	+4		20	67	13	4.1	6	28	13	-7
	Neuralgia	82	75	62	4.1	21	135	56	-35		78	84	66	4.1	14	112	31	-17		80	82	66	4.2	34	132	45	-11
	Pneumonia	37	59	22	6.3	4	43	27	-23		62	63	39	5.2	9	55	30	-21		75	68	51	4.9	18	104	36	-18
	Puerperal Fever	11	45	5	5.6	1	8	10	-9		8	42	4	7.5	0	5	3	-3		7	25	2	5.4	2	2	1	+1
	Rheumatism	89	79	70	4.6	21	131	73	-52		84	89	75	4.7	15	104	54	-39		82	83	74	4.4	26	139	67	-41
	Scarlatina	35	62	22	5.9	3	37	27	-24		32	76	24	6.2	5	32	17	-12		37	61	23	5.3	8	41	16	-8
	Small-pox	0	0	0	0	0	0	0	0		1	25	0.4	20.0	0	0	1	-1		3	40	1	19.5	1	1	2	-1
	Tonsilitis	72	59	43	4.7	10	102	33	-23		70	73	52	4.3	10	93	25	-15		80	75	60	3.9	25	117	45	-20
	Whooping-cough	32	65	21	5.6	5	50	6	-1		34	71	25	5.8	4	39	9	-5		39	73	28	5.4	10	61	16	-6

TABLE 2.—CONTINUED.—*Diseases in the Upper-Peninsular, the North-Western, the Western, and the Bay-and-Eastern Divisions* of the State, by Year and Months,† in 1879.*

DIVISIONS.*	DISEASES.	PER CENT OF WEEKLY REPORTS WHICH STATED PRESENCE OF DISEASES NAMED.[d]																										
		YEAR 1879.†	Jan.†	Feb.†	Mar.†	Apr.†	May.†	June.†	July.†	Aug.†	Sept.†	Oct.†	Nov.†	Dec.†	DIVS.*	YEAR 1879.†	Jan.†	Feb.†	Mar.†	April.†	May.†	June.†	July.†	Aug.†	Sept.†	Oct.†	Nov.†	Dec.†
UPPER-PENINSULAR DIVISION.*	AVERAGE FOR TABULATED DISEASES REPORTED PRESENT	31	49	62	48	56	57	31	45	61	50	54	51	42	NORTH-WESTERN DIVISION.*	22	50	51	39	53	43	40	25	44	42	39	41	31
	Bronchitis	62	80	70	83	70	88	29	22	57	33	64	59	73		42	50	57	38	0	0	50	30	38	50	50	50	50
	Cerebro-spinal Meningitis	2	0	0	0	0	0	0	0	0	0	21	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0
	Cholera Infantum	13	7	0	8	0	0	14	44	71	33	7	0	0		16	0	0	0	0	0	13	70	75	13	0	0	0
	Cholera Morbus	14	0	0	0	0	0	29	56	86	33	7	0	0		13	0	0	0	0	0	0	30	38	13	40	0	10
	Consumption, Pulmonary	92	93	100	100	100	88	71	100	86	100	100	100	67		18	70	57	13	0	25	0	0	0	13	10	0	20
	Croup, Membranous	10	47	20	17	0	0	14	0	0	0	0	0	0		1	0	14	0	0	0	0	0	0	0	0	0	0
	Diphtheria	4	7	----	33	0	0	0	0	0	0	0	0	0		15	50	43	25	0	0	13	10	0	13	10	0	0
	Diarrhea	50	27	20	50	20	----	29	78	100	100	93	50	27		45	10	29	38	0	25	63	90	100	100	50	13	0
	Dysentery	18	0	0	8	0	0	29	33	100	50	0	13	20		14	0	0	0	0	0	0	20	63	0	10	13	40
	Erysipelas	24	33	60	42	20	0	43	56	14	0	0	25	7		6	0	29	13	0	25	13	10	0	0	0	0	0
	Fever, Intermittent	8	13	0	0	40	38	14	0	0	0	0	0	0		54	40	57	50	0	75	88	40	63	100	50	50	40
	Fever, Remittent	6	0	0	17	0	0	0	0	14	17	14	0	0		1	0	0	0	0	0	0	0	13	0	0	0	0
	Fever, Typhoid (Enteric)	22	0	0	8	0	13	57	11	100	33	43	50	0		2	0	0	0	0	0	0	10	13	0	0	0	0
	Fever, Typho-malarial	9	----	0	0	0	0	0	0	0	33	36	38	0		27	0	0	0	0	0	0	10	63	50	80	63	30
	Influenza	71	87	90	83	90	75	29	0	29	75	57	100	93		23	30	57	50	0	0	50	20	13	0	20	0	20
	Measles	5	13	0	17	0	0	0	0	0	0	0	0	13		5	0	0	0	0	0	50	10	0	0	0	0	0
	Neuralgia	61	67	70	67	80	100	43	33	29	67	86	50	33		46	60	43	25	0	0	50	20	50	75	70	88	30
	Pneumonia	41	87	80	67	40	25	14	56	0	17	0	25	47		31	60	100	100	40	25	0	10	0	13	10	13	20
	Puerperal Fever	3	0	0	0	0	0	0	0	0	----	0	38	7		4	0	0	25	0	0	13	10	0	0	0	0	0
	Rheumatism	68	93	60	83	80	63	43	44	43	75	79	50	60		54	90	71	63	20	0	50	50	50	50	50	50	60
	Scarlatina	48	40	50	83	70	25	14	11	0	42	100	50	40		21	40	43	0	100	100	38	10	0	0	0	0	0
	Small-pox	0	0	0	0	0	0	0	0	0	0	0	0	0		0	0	0	0	----	0	0	0	0	0	0	0	0

	Tonsilitis	54	60	70	67	40	63	43	0	0	67	71	75	60		34	40	57	25	....	25	38	10	25	13	80	63	20
	Whooping-cough	30	33	40	33	20	50	14	0	0	25	36	50	40		22	60	57	50	....	0	38	10	13	0	10	13	0
Western Division.*	Average for Tabulated Diseases Reported Present	40	41	43	45	52	48	38	42	47	46	46	43	46	Bay-and-Eastern Division.*	38	46	50	44	43	43	45	46	42	40	33	45	40
	Bronchitis	65	88	85	80	83	80	55	20	30	52	61	68	83		81	87	89	89	96	91	80	73	62	67	70	90	90
	Cerebro-spinal Meningitis	2	0	0	0	0	0	0	8	4	4	7	0	0		3	0	0	14	2	0	0	6	4	0	4	0	6
	Cholera Infantum	16	0	5	5	0	0	0	40	63	35	18	9	0		16	2	6	0	4	0	10	53	58	41	4	0	2
	Cholera Morbus	33	20	20	15	21	35	45	44	70	39	43	18	21		21	0	0	6	6	6	25	63	76	43	11	0	....
	Consumption, Pulmonary	42	40	40	40	42	45	40	40	37	43	54	41	41		74	69	67	67	83	82	90	86	76	67	70	72	58
	Croup, Membranous	5	4	0	5	0	0	0	0	0	13	14	9	14		9	20	14	3	8	15	8	0	4	4	5	15	19
	Diphtheria	43	40	45	15	13	20	10	24	48	61	75	77	69		39	38	56	53	40	39	33	35	22	11	39	67	50
	Diarrhea	46	16	0	25	42	35	30	76	96	83	50	41	38		50	20	19	25	27	39	68	92	98	78	48	38	38
	Dysentery	29	4	5	10	21	30	10	56	74	52	39	18	17		20	4	0	11	0	0	15	49	71	48	11	13	4
	Erysipelas	47	28	50	60	58	80	50	56	44	39	36	45	34		26	53	42	39	33	33	33	24	0	9	16	15	21
	Fever, Intermittent	82	64	65	65	75	75	80	96	100	100	93	86	76		96	91	89	89	100	100	100	100	96	96	100	95	94
	Fever, Remittent	83	60	60	70	83	95	90	100	93	87	96	73	86		62	56	47	50	63	61	70	80	80	70	55	56	54
	Fever, Typhoid (Enteric)	12	4	10	0	0	5	0	4	19	22	29	18	24		9	4	6	11	8	3	0	2	9	9	14	26	17
	Fever, Typho-malarial	23	0	10	15	13	10	5	32	41	52	29	32	28		30	33	8	11	8	12	33	31	42	67	45	41	17
	Influenza	55	76	85	80	63	75	30	44	26	35	46	45	66		49	76	78	69	73	52	48	27	22	28	25	51	58
	Measles	16	20	25	20	....	10	10	16	15	43	7	14	10		29	20	14	22	50	79	78	47	11	9	9	13	13
	Neuralgia	73	52	70	85	88	75	70	48	63	83	89	86	76		63	62	72	75	58	36	60	51	58	54	70	79	79
	Pneumonia	40	56	55	80	63	75	35	12	11	22	18	36	41		50	89	97	83	56	52	38	24	11	30	29	51	67
	Puerperal Fever	5	0	5	0	0	5	5	0	0	13	29	5	....		2	0	0	3	2	9	0	0	2	4	2	3	2
	Rheumatism	74	84	75	90	83	80	80	64	52	65	64	73	83		79	89	92	92	96	79	75	71	71	72	70	74	79
	Scarlatina	32	40	40	55	50	45	25	8	33	26	36	32	7		18	13	44	39	38	15	10	16	2	11	7	13	19
	Small-pox	0	0	0	0	0	0	0	0	0	0	0	0	0		1	0	0	0	0	0	3	6	0	0	0	0	0
	Tonsilitis	58	44	60	60	67	65	35	44	41	52	68	77	76		47	58	67	69	60	21	40	33	24	22	41	64	65
	Whooping-cough	33	40	40	30	25	10	15	40	30	43	51	36	21		31	29	39	47	35	36	43	39	20	28	18	18	23

*, †, d. The footnotes to which these marks refer are printed on page 375.

TABLE 2.—CONTINUED.—*Diseases in the Central, the South-Western, the Southern-Central, and the South-Eastern Divisions* of the State, by Year and Months,† in 1879.*

DIVISIONS.*	DISEASES.	PER CENT OF WEEKLY REPORTS WHICH STATED PRESENCE OF DISEASES NAMED.[d]																										
		YEAR 1879.†	Jan.†	Feb.†	Mar.†	April.†	May.†	June.†	July.†	Aug.†	Sept.†	Oct.†	Nov.†	Dec.†	DIVS.*	YEAR 1879.†	Jan.†	Feb.†	Mar.†	April.†	May.†	June.†	July.†	Aug.†	Sept.†	Oct.†	Nov.†	Dec.†
CENTRAL DIVISION.*	AVERAGE FOR TABULATED DISEASES REPORTED PRESENT	31	35	37	35	32	33	35	33	41	36	33	36	34	SOUTH-WESTERN DIVISION.*	31	43	53	55	40	32	28	30	36	38	40	39	38
	Bronchitis	56	71	74	72	62	63	52	36	39	41	54	64	63		54	70	91	84	59	34	31	33	39	42	65	63	67
	Cerebro-spinal Meningitis	1	0	0	2	0	0	3	1	0	0	1	0	0		2	0	0	0	3	3	3	0	8	3	0	0	0
	Cholera Infantum	19	8	6	9	8	2	8	37	56	38	20	13	4		89	0	0	0	0	0	0	8	45	34	5	0	2
	Cholera Morbus	19	5	8	2	6	3	17	47	55	32	13	9	1		19	0	0	0	3	10	5	41	76	39	8	3	7
	Consumption, Pulmonary	71	75	76	72	88	75	75	72	80	74	63	52	65		74	87	83	95	94	79	74	55	55	68	70	81	72
	Croup, Membranous	4	7	4	7	10	8	0	0	1	1	0	5	8		7	17	13	16	9	3	5	2	3	5	8	13	7
	Diphtheria	31	46	34	22	24	20	23	15	32	24	23	48	57		31	40	35	16	16	10	26	29	34	34	50	41	30
	Diarrhea	47	25	18	20	20	34	46	76	87	78	57	47	19		41	3	13	0	22	17	28	75	84	84	60	22	26
	Dysentery	14	0	0	0	0	2	3	20	45	49	23	9	3		11	0	0	0	0	0	0	12	45	29	20	6	0
	Erysipelas	19	17	8	33	10	25	28	26	17	15	14	16	19		18	40	30	32	31	28	10	14	11	11	5	9	14
	Fever, Intermittent	81	47	74	80	76	90	92	92	92	93	85	78	62		86	73	57	53	81	90	85	98	92	97	100	88	79
	Fever, Remittent	62	42	46	52	60	61	77	80	79	63	63	52	51		52	13	17	5	25	48	51	57	74	79	80	66	56
	Fever, Typhoid (Enteric)	14	3	0	0	8	0	0	1	17	29	30	38	28		2	0	0	0	0	0	0	0	3	8	5	0	5
	Fever, Typho-malarial	17	12	8	9	4	3	13	17	24	28	30	23	18		19	17	26	21	25	14	10	8	21	29	35	16	16
	Influenza	39	73	84	78	40	22	27	23	17	26	31	38	42		46	53	96	100	84	34	18	20	32	42	28	44	63
	Measles	5	0	4	4	0	19	13	10	0	1	1	0	9		3	0	0	0	6	14	8	4	0	0	0	3	2
	Neuralgia	55	39	48	63	56	58	62	58	48	46	58	55	62		61	33	48	63	56	66	62	61	55	58	73	69	79
	Pneumonia	38	56	86	72	58	27	24	20	14	19	23	42	58		33	43	74	84	66	21	18	8	8	26	33	38	35
	Puerperal Fever	4	19	0	7	2	0	0	4	0	1	5	5	1		1	0	0	0	0	0	3	2	0	0	0	0	5
	Rheumatism	61	64	58	59	62	68	62	61	54	54	63	69	61		75	87	96	100	88	69	79	63	42	61	80	84	84
	Scarlatina	14	32	14	13	8	8	0	10	7	7	24	20	19		14	13	0	0	13	3	3	8	11	11	23	38	40
	Small-pox	0.1	0	0	0	0	0	0	1	0	0	0	0	0		0	0	0	0	0	0	0	0	0	0	0	0	0

	Tonsilitis	39	37	44	48	36	51	59	32	30	31	25	42	48		39	60	70	53	38	34	26	22	13	34	40	38	67
	Whooping-cough	24	22	10	11	8	17	13	29	30	32	23	31	42		12	0	0	0	0	0	10	14	13	13	18	19	35
SOUTHERN-CENTRAL DIVISION.*	AVERAGE FOR TABULATED DISEASES REPORTED PRESENT	30	39	41	37	37	34	29	30	40	36	30	31	31	SOUTH-EASTERN DIVISION.*	40	46	46	41	48	40	43	46	48	49	47	49	47
	Bronchitis	65	91	93	92	90	64	53	36	30	47	53	58	89		72	94	100	90	86	70	61	46	51	66	66	66	81
	Cerebro-spinal Meningitis	3	5	9	7	7	0	0	2	4	0	2	0	2		3	8	10	10	10	0	0	0	0	0	0	0	0
	Cholera Infantum	8	0	0	2	0	0	0	22	39	21	2	1	0		14	0	0	5	0	0	5	47	74	23	0	0	0
	Cholera Morbus	17	1	....	2	3	9	4	44	70	44	14	1	2		19	0	3	5	0	5	14	64	70	34	15	0	2
	Consumption, Pulmonary	68	73	73	68	72	70	67	68	63	61	69	71	66		89	76	83	85	88	91	100	92	91	91	98	97	83
	Croup, Membranous	4	11	5	8	9	4	0	0	0	1	1	1	13		12	36	23	18	22	0	0	0	0	0	4	13	32
	Diphtheria	18	33	14	14	10	21	17	13	4	13	24	29	21		33	52	50	38	31	9	9	12	34	34	31	39	55
	Diarrhea	44	13	21	22	22	27	28	71	94	86	57	33	31		60	36	40	43	59	45	66	78	96	84	64	61	47
	Dysentery	15	4	5	0	7	9	5	23	58	24	13	12	11		26	18	20	18	24	7	11	29	55	52	31	29	17
	Erysipelas	19	19	16	20	24	31	24	19	28	15	9	10	14		36	44	35	38	49	30	39	37	28	32	34	37	28
	Fever, Intermittent	86	68	75	78	78	93	97	99	100	99	98	80	66		83	64	73	88	90	91	91	98	89	100	83	66	58
	Fever, Remittent	57	47	48	49	54	51	51	62	79	72	67	55	47		59	32	30	30	49	66	80	81	89	75	75	47	43
	Fever, Typhoid (Enteric)	6	0	0	3	6	0	4	4	10	11	10	13	9		26	26	20	20	20	11	16	19	17	36	55	42	28
	Fever, Typho-malarial	17	16	16	8	0	6	3	8	30	36	33	25	22		30	20	25	28	16	18	25	20	28	55	57	47	26
	Influenza	36	55	66	56	64	36	22	17	24	31	16	25	38		59	96	98	100	88	59	41	32	26	36	42	42	62
	Measles	2	0	0	0	9	9	8	3	0	0	0	0	0		30	14	10	10	14	25	34	34	28	32	45	53	57
	Neuralgia	54	47	63	75	60	49	54	43	46	51	49	61	64		60	54	60	68	84	57	61	56	49	55	49	66	68
	Pneumonia	34	72	66	63	64	31	16	11	13	13	3	29	47		57	74	90	80	73	64	52	37	38	41	42	50	58
	Puerperal Fever	3	4	4	2	6	1	4	3	0	4	6	3	1		5	4	18	23	6	2	0	2	2	9	2	0	0
	Rheumatism	72	79	79	80	85	73	67	61	55	65	67	77	73		81	78	90	78	80	84	91	76	66	77	81	87	87
	Scarlatina	19	47	21	34	25	28	22	6	8	7	9	16	14		45	56	48	58	45	52	43	58	30	30	36	42	43
	Small-pox	0.02	0	0	0	0	0	3	0	0	0	0	0	0		1	0	0	0	0	2	5	0	0	0	0	3	8
	Tonsilitis	47	60	71	66	61	48	39	19	27	21	46	51	68		48	60	55	70	59	43	41	34	36	41	40	45	55
	Whooping-cough	21	40	36	20	30	16	26	16	17	29	11	7	8		21	16	25	18	10	11	9	10	19	18	23	47	47

*, †, ᵈ. The footnotes to which these marks refer are given on page 375.

EXHIBIT 23.—*By Months and by Geographical Divisions of the State, the Names of Observers whose Weekly Reports of Diseases are Compiled in Tables 1, 2, 3, and 4, the Localities*[a] *for which they Report, and the Number of Reports received from each Observer.*

DIVISIONS AND LOCALITIES REPRESENTED AND PHYSICIANS WHO REPORTED. (Health Officers in italics; those also Correspondents marked with a *.)	WEEKLY REPORTS IN 1879—COMPILED ON PAGES 372-433.												
	Year 1879.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
ALL LOCALITIES	3,755	319	250	248	290	268	312	395	322	319	381	284	367
UPPER-PENINSULAR DIVISION†	**127**	**15**	**10**	**12**	**10**	**8**	**7**	**9**	**7**	**12**	**14**	**8**	**15**
Central Mine, Geo. W. Orr, M. D.	5	----	----	----	----	----	----	----	----	----	----	----	5
Houghton, H. W. Jones, M. D.	52	5	3	4	5	4	4	5	4	4	5	4	5
Ishpeming, *W. T. Carpenter,* M. D.*	40	5	4	4	5	4	3	4	3	4	4	----	----
Marquette, *Geo. J. Northrop,*M. D.*	18	----	----	----	----	----	----	----	----	4	5	4	5
Negaunee, *A. C. MacKenzie, M. D.*	12	5	3	4	----	----	----	----	----	----	----	----	----
NORTH-WESTERN DIVISION†	**96**	**10**	**7**	**8**	**5**	**4**	**8**	**10**	**8**	**8**	**10**	**8**	**10**
Cadillac, Carroll E. Miller, M. D.	31	----	----	----	----	----	4	5	4	4	5	4	5
Cadillac, *J. M. Wardell, M. D.*	52	5	3	4	5	4	4	5	4	4	5	4	5
Manistee, *J. Kinsley, M. D.*	13	5	4	4	----	----	----	----	----	----	----	----	----
NORTH-EASTERN DIVISION†	**33**	**5**	**4**	**4**	----	----	**3**	**5**	**4**	**4**	**4**	----	----
Alpena, Wm. P. Maiden, M. D.	33	5	4	4	----	----	3	5	4	4	4	----	----
WESTERN DIVISION†	**283**	**25**	**20**	**20**	**24**	**20**	**20**	**25**	**27**	**23**	**28**	**22**	**29**
Cedar Springs, C. S. Ford, M. D.	35	----	----	----	----	4	4	5	4	4	5	4	5
Drenthe, Henry Kremers, M. D.	22	----	----	----	----	----	----	----	4	4	5	4	5
Gr'nd Haven, *J. N. Reynolds, M. D.*	9	----	----	----	----	----	----	----	3	----	----	2	4
Gr'nd Haven, *A. VanderVeen,* M.D.*	53	5	4	4	5	4	4	5	4	4	5	4	5
Grand Rapids, A. Hazlewood, M. D.	53	5	4	4	5	4	4	5	4	4	5	4	5
Grand Rapids, *L. DePuy, M. D.*	6	----	----	----	----	----	----	----	----	3	3	----	----
Holland, *B. Ledeboer, M. D.*	35	5	4	4	5	4	4	5	4	----	----	----	----
Ludington, *A. P. McConnell, M. D.*	17	5	4	4	4	----	----	----	----	----	----	----	----
Muskegon, *O. C. Williams, M. D.*	53	5	4	4	5	4	4	5	4	4	5	4	5
NORTHERN-CENTRAL DIVISION†	**53**	**5**	**4**	**4**	**5**	**4**	**4**	**5**	**4**	**4**	**5**	**4**	**5**
Big Rapids, *I. W. Badger, M. D.*	53	5	4	4	5	4	4	5	4	4	5	4	5
BAY-AND-EASTERN DIVISION†	**521**	**45**	**36**	**36**	**48**	**33**	**40**	**49**	**45**	**46**	**56**	**39**	**48**
Bay City, W. H. Burr, M. D.	39	5	4	4	5	4	4	5	4	4	----	----	----
Bay City, W. R. Marsh, M. D.	53	5	4	4	5	4	4	5	4	4	5	4	5
Lapeer, A. Nash, M. D.	16	----	----	----	5	4	4	3	----	----	----	----	----
Lapeer, *Hugh McColl, M. D.*	20	----	----	----	----	----	----	3	3	2	4	3	5
Lapeer, I. H. Taylor, M. D.	11	----	----	----	----	----	----	----	----	----	3	4	4
Port Huron, *S. W. Smith, M. D.*	18	5	4	4	5	----	----	----	----	----	----	----	----
Port Huron, *E. P. Tibbals, M. D.*	24	----	----	----	----	----	----	3	4	4	5	4	4
Port Huron, A. A. Whitney, M. D.	53	5	4	4	5	4	4	5	4	4	5	4	5
Port Sanilac, J. M. Loop, M. D.	36	5	4	4	3	----	----	----	2	4	5	4	5
Saginaw City, *E. A. Herig, M. D.*	38	----	----	----	3	4	4	5	4	4	5	4	5
Saginaw City, N. D. Lee, M. D.	51	5	4	4	5	2	4	5	4	4	5	4	5
Saginaw City, *I. N. Smith, M. D.*	15	5	4	4	2	----	----	----	----	----	----	----	----
St. Clair, *C. G. Robertson, M. D.*	25	----	----	----	----	3	4	5	4	4	5	----	----
Thornville, J. S. Caulkins, M. D.	53	5	4	4	5	4	4	5	4	4	5	4	5
West Bay City, *J. W. Hauxhurst, M. D.*	38	5	4	4	5	4	4	----	4	4	4	----	----
West Bay City, *I. E. Randall,* M. D.*	31	----	----	----	----	----	4	5	4	4	5	4	5
CENTRAL DIVISION†	**793**	**59**	**50**	**46**	**50**	**59**	**71**	**92**	**71**	**68**	**84**	**64**	**79**
Charlotte, G. B. Allen, M. D.	41	5	3	4	5	3	4	5	4	4	4	----	----
Charlotte, *P. D. Patterson, M. D.*	34	----	----	----	----	3	4	5	4	4	5	4	5
Corunna, *A. G. Bruce, M. D.*	34	----	----	----	----	3	4	5	4	4	5	4	5
DeWitt, G. W. Topping, M. D.	53	5	4	4	5	4	4	5	4	4	5	4	5
Elsie, E. V. Chase, M. D.	27	----	----	----	----	----	----	5	4	4	5	4	5
Elsie, E. B. Taylor, M. D.	6	----	4	2	----	----	----	----	----	----	----	----	----
Flint, *Jas. B. F. Curtis, M. D.*	11	4	3	4	----	----	----	----	----	----	----	----	----
Greenville, *Jas. Mulhern, M. D.*	14	----	----	----	----	2	4	5	3	----	----	----	----
Hastings, A. P. Drake, M. D.	52	5	4	4	5	4	3	5	4	4	5	4	5
Howard City, J. R. Hathaway, M.D.	6	----	----	----	----	2	4	----	----	----	----	----	----
Howell, C. V. Beebe, M. D.	9	5	4	----	----	----	----	----	----	----	----	----	----
Hubbardston, H. W. Browne, M.D.	53	5	4	4	5	4	4	5	4	4	5	4	5
Ionia (House of Correction), W. F. Reed, M. D.	35	----	----	----	----	4	4	5	4	4	5	4	5
Ionia, *S. V. Romig, M. D.*	53	5	4	4	5	4	4	5	4	4	5	4	5

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[a] Health officers of cities are supposed to report for their cities only; the reports of other observers are not thus restricted in locality, but in many cases include the vicinity as well as the corporate limits of the place named.

* Health Officer and Correspondent. † For counties in each division, see Exhibit 1, page 227.

EXHIBIT 23—CONTINUED.

DIVISIONS AND LOCALITIES REPRESENTED AND PHYSICIANS WHO REPORTED. (Health Officers in italics; those also Correspondents marked with a *.)	WEEKLY REPORTS IN 1879—COMPILED ON PAGES 372-433.												
	YEAR 1879.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
CENTRAL DIVISION.†—*Continued:*													
Ithaca, I. N. Monfort, M. D.	35	----	----	----	----	4	4	5	4	4	5	4	5
Lansing, *J. H. Wellings, M. D.*	33	----	----	----	----	2	4	5	4	4	5	4	5
Mason, *W. W. Root, M. D.**	8	----	----	----	----	----	4	4	----	----	----	----	----
Muir, L. S. Stevens, M. D.	25	----	----	----	----	----	----	3	4	4	5	4	5
North Lansing, O. Marshall, M. D.	53	5	4	4	5	4	4	5	4	4	5	4	5
Otisville, A. W. Nicholson, M. D.	53	5	4	4	5	4	4	5	4	4	5	4	5
Ovid, O. B. Campbell, M. D.	52	5	4	4	5	4	4	5	4	4	5	4	4
Vernon, D. C. Holly, M. D.	53	5	4	4	5	4	4	5	4	4	5	4	5
Webberville, R. B. Smith, M. D.	53	5	4	4	5	4	4	5	4	4	5	4	5
SOUTH-WESTERN DIVISION†	**414**	**30**	**23**	**19**	**32**	**29**	**39**	**51**	**38**	**38**	**40**	**32**	**43**
Allegan, W. H. Bills, M. D.	24	----	----	----	----	----	----	2	4	4	5	4	5
Allegan, H. S. Lay, M. D.	29	5	4	4	5	4	4	3	----	----	----	----	----
Cassopolis, F. Goodwin, M. D.	31	----	----	----	----	----	4	5	4	4	5	4	5
Dayton, Robert Henderson, M. D.	11	----	----	----	----	----	----	----	----	----	2	4	5
Dayton, W. A. Neal, M. D.	14	----	----	----	----	----	----	3	4	4	3	----	----
Dowagiac, *E. C. Prindle, M. D.*	18	----	----	----	----	4	4	5	3	2	----	----	----
Mattawan, Thos. H. Briggs, M. D.	32	5	3	3	3	2	3	3	3	4	----	----	3
New Troy, Geo. H. Riley, M. D.	17	----	----	----	4	4	4	5	----	----	----	----	----
Niles, *O. P. Horn, M. D.*	19	5	4	4	5	1	----	----	----	----	----	----	----
Niles, Jas. S. Reeves, M. D.	53	5	4	4	5	4	4	5	4	4	5	4	5
Niles, *Irwin Simpson, M. D.*	33	----	----	----	----	2	4	5	4	4	5	4	5
Otsego, Milton Chase, M. D.	53	5	4	4	5	4	4	5	4	4	5	4	5
Paw Paw, Josiah Andrews, M. D.	40	----	----	----	5	4	4	5	4	4	5	4	5
St. Joseph, R. F. Stratton, M. D.	40	5	4	----	----	----	4	5	4	4	5	4	5
SOUTHERN-CENTRAL DIVISION†	**874**	**75**	**56**	**59**	**67**	**67**	**76**	**90**	**71**	**72**	**87**	**69**	**85**
Adrian, Robert Stephenson, M. D.	17	5	4	4	4	----	----	----	----	----	----	----	----
Adrian, *A. M. Stephenson, M. D.*	36	----	----	----	1	4	4	5	4	4	5	4	5
Albion, A. McD. Duncan, M. D.	12	----	----	----	----	----	----	----	----	----	3	4	5
Albion, John P. Stoddard, M. D.	39	5	4	4	5	4	4	5	3	4	1	----	----
Battle Creek, *S. S. French,* M. D.*	34	----	----	----	----	3	4	5	4	4	5	4	5
Brooklyn, E. N. Palmer, M. D.	46	5	4	3	----	4	3	5	4	4	5	4	5
Centerville, Marden Sabin, M. D.	29	----	----	----	----	----	2	5	4	4	5	4	5
Clinton, A. W. Alvord, M. D.	53	5	4	4	5	4	4	5	4	4	5	4	5
Coldwater, S. S. Cutter, M. D.	14	----	----	1	5	4	4	----	----	----	----	----	----
Coldwater, *G. V. Voorhees, M. D.*	33	----	----	----	----	2	4	5	4	4	5	4	5
Coldwater, *L. H. Wurtz,* M. D.*	12	5	4	3	----	----	----	----	----	----	----	----	----
Hillsdale, *A. Cressy, M. D.*	9	5	----	4	----	----	----	----	----	----	----	----	----
Hillsdale, *John W. Falley,* M. D.*	29	----	----	----	----	----	2	5	4	4	5	4	5
Jackson (Prison), E. L. Kimball, M. D.	53	5	4	4	5	4	4	5	4	4	5	4	5
Jackson, *Phil Porter, M. D.*	9	----	----	----	4	3	2	----	----	----	----	----	----
Jackson, W. Worsfold, M. D.	53	5	4	4	5	4	4	5	4	4	5	4	5
Kalamazoo, W. B. Southard, M. D.	53	5	4	4	5	4	4	5	4	4	5	4	5
Marshall, *B. A. Gallup, M. D.*	10	----	----	----	----	4	3	----	----	----	----	3	----
Marshall, *H. L. Joy,* M. D.*	53	5	4	4	5	4	4	5	4	4	5	4	5
Mendon, H. C. Clapp, M. D.	50	5	4	4	5	3	4	5	4	4	5	2	5
Mendon, Edwin Stewart, M. D.	53	5	4	4	5	4	4	5	4	4	5	4	5
Sturgis, Nelson I. Packard, M. D.	47	5	4	4	3	----	4	5	4	4	5	4	5
Three Rivers, C. W. Backus, M. D.	53	5	4	4	5	4	4	5	4	4	5	4	5
Union City, Nelson H. Claflin, M. D	35	----	----	----	----	4	4	5	4	4	5	4	5
Ypsilanti, *Edward Batwell,* M. D.*	42	5	4	4	5	4	4	5	4	4	3	----	----
SOUTH-EASTERN DIVISION†	**561**	**50**	**40**	**40**	**49**	**44**	**44**	**59**	**47**	**44**	**53**	**38**	**53**
Detroit, Leartus Connor, M. D.	53	5	4	4	5	4	4	5	4	4	5	4	5
Detroit, *Elisha Leach, M. D.*	53	5	4	4	5	4	4	5	4	4	5	4	5
Detroit, W. H. Rouse, M. D.	53	5	4	4	5	4	4	5	4	4	5	4	5
Milford, Robert Johnston, M. D.	53	5	4	4	5	4	4	5	4	4	5	4	5
Monroe, *A. J. Masecar, M. D.*	34	----	----	----	----	4	4	5	4	4	5	4	4
Monroe, *Peter Soans, M. D.*	4	----	----	----	4	----	----	----	----	----	----	----	----
Northville, J. M. Swift, M. D.	50	5	4	4	5	4	4	5	4	4	4	2	5
Pontiac, W. G. Elliot, M. D.	34	5	4	4	5	4	4	5	3	----	----	----	----
Trenton, Wellington Carleton, M. D.	26	----	----	----	----	----	----	4	4	4	5	4	5
Utica, G. G. Roberson, M. D.	43	5	4	4	----	4	4	5	4	4	4	----	5
Washington, Albert Yates, M. D.	53	5	4	4	5	4	4	5	4	4	5	4	5
Wyandotte, E. P. Christian, M. D.	53	5	4	4	5	4	4	5	4	4	5	4	5
Wyandotte, *T. J. Langlois, M. D.*	52	5	4	4	5	4	4	5	4	4	5	4	4

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* Health Officer and Correspondent. † For counties in each division, see Exhibit 1, page 227.

TABLE 3.—*Exhibiting by Localities and by Divisions of the State, for the Year and for each Month of the Year 1879 (ending* **January** *3, 1880), Facts relative to the Occurrence and the Order of Prevalence of Diseases in Michigan, as compiled from 3,755 Weekly Reports made by Health Officers of Cities and by Regular Correspondents of the State Board of Health,—stating for each Disease the Per Cent of Weeks it was reported Present where Present, and Its Average Order of Prevalence when Present, thus indicating the Prevalence as regards Time, and also as regards Area so far as this is represented by the localities. For the Year and for the Five Weeks ending* **February** *1, 1879.*

Line Number.	Divisions and Localities Represented, and Initials of Physicians who Reported.* (Health Officers in italics; those also Correspondents marked with a *.)	Reports Received.	Bronchitis. Per cent of Weeks Present.‡	Bronchitis. Av. Order of Prevalence when Present.§	Cerebro-Spinal Men'gitis. Per cent of Weeks Present.‡	Cerebro-Spinal Men'gitis. Av. Order of Prevalence when Present.§	Cholera Infantum. Per cent of Weeks Present.‡	Cholera Infantum. Av. Order of Prevalence when Present.§	Cholera Morbus. Per cent of Weeks Present.‡	Cholera Morbus. Av. Order of Prevalence when Present.§	Consumption, Pulmonary. Per cent of Weeks Present.‡	Consumption, Pulmonary. Av. Order of Prevalence when Present.§	Croup, Membraneous. Per cent of Weeks Present.‡	Croup, Membraneous. Av. Order of Prevalence when Present.§	Diphtheria. Per cent of Weeks Present.‡	Diphtheria. Av. Order of Prevalence when Present.§	Diarrhea. Per cent of Weeks Present.‡	Diarrhea. Av. Order of Prevalence when Present.§	Dysentery. Per cent of Weeks Present.‡	Dysentery. Av. Order of Prevalence when Present.§	Erysipelas. Per cent of Weeks Present.‡	Erysipelas. Av. Order of Prevalence when Present.§	Fever, Intermittent. Per cent of Weeks Present.‡	Fever, Intermittent. Av. Order of Prevalence when Present.§	Fever, Remittent. Per cent of Weeks Present.‡	Fever, Remittent. Av. Order of Prevalence when Present.§	Fever, Typhoid (Enteric.) Per cent of Weeks Present.‡	Fever, Typhoid (Enteric.) Av. Order of Prevalence when Present.§	Fever, Typho-Malarial. Per cent of Weeks Present.‡	Fever, Typho-Malarial. Av. Order of Prevalence when Present.§
1	YEAR 1879:— All Localities ‖	a 3755	84	3.6	45	7.4	60	5.4	58	5.3	90	5.6	40	6.6	63	5.4	74	4.4	57	6.2	58	6.5	91	2.2	82	3.3	63	7.0	67	5.8
2	Upper-Peninsular Div. †	127	75	2.7	60	6.0	40	3.0	62	2.3	96	3.4	46	4.1	56	3.0	70	3.0	50	4.0	42	5.1	48	4.0	35	5.4	68	4.4	92	4.0
3	North-Western Div. †	96	82	3.1	0	0	58	1.7	43	3.0	47	6.3	25	10.0	45	3.3	66	3.3	48	3.7	29	4.0	74	3.2	25	7.0	22	5.5	65	3.0
4	Western Division †	283	81	5.0	33	9.8	59	6.8	66	7.1	86	7.7	48	7.0	73	5.3	73	5.0	62	6.9	76	7.4	90	2.7	92	2.8	58	9.5	71	7.3
5	Northern-Central Div. †	53	48	3.1	33	5.5	63	6.0	35	4.0	32	4.8	20	5.0	62	3.2	40	3.3	59	2.5	53	4.1	82	1.5	33	4.1	47	4.5	63	3.7
6	Bay-and-Eastern Div. †	521	93	3.7	40	7.1	60	5.4	68	5.4	88	6.0	35	6.6	64	6.0	72	4.1	52	5.8	63	6.3	97	1.7	84	4.1	48	7.3	59	6.1
7	Central Division †	793	77	3.9	23	6.8	67	5.3	52	5.4	89	5.5	32	5.9	63	4.8	75	3.8	57	5.1	50	5.4	91	2.0	83	3.0	65	5.3	60	5.8
8	South-Western Div. †	414	73	3.8	33	4.0	51	4.9	52	4.1	89	4.7	36	5.1	59	3.8	66	4.0	52	4.4	47	4.8	91	2.3	75	2.7	30	9.7	69	3.4
9	Southern-Central Div. †	874	86	2.8	53	8.0	51	5.4	57	5.3	89	5.8	38	6.6	53	5.5	75	4.3	55	5.8	52	6.3	92	2.2	80	3.3	57	6.0	66	5.7
10	South-Eastern Div. †	561	93	3.5	77	9.8	69	7.1	60	6.2	97	5.8	56	8.9	72	7.6	81	6.3	66	9.4	73	9.8	92	2.7	88	3.8	80	8.8	79	7.1
11	JANUARY 1879:— All Localities ‖	319	88	2.6	67	8.3	47	7.3	64	7.6	90	5.7	44	7.0	72	5.3	54	6.8	46	9.3	69	6.8	80	3.4	72	4.9	60	8.2	71	7.3
12	UPPER-PENIN. DIV. †	15	80	3	0	0	20	4	0	0	93	4	70	3	20	4	40	4	0	0	50	6	40	4	0	0	0	0	0	0
13	Houghton—H. W. J.	5	100	3	----	----	----	----	----	----	100	3	80	4	----	----	60	4	----	----	40	7	40	4	----	----	----	----	----	----
14	Ishpeming—*W. T. C.* *	5	60	2	0	0	0	0	0	0	100	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	Negaunee—*A. C. M.*	5	80	3	0	0	20	4	0	0	80	5	60	2	20	4	20	3	0	0	60	5	0	0	0	0	0	0	----	----
16	NORTH-WESTERN DIV. †	10	50	4	0	0	0	0	0	0	70	6	0	0	100	3	20	8	0	0	0	0	40	4	0	0	0	0	0	0
17	Cadillac—*J. M. W.*	5	20	6	0	0	0	0	0	0	40	6	0	0	100	3	0	0	0	0	0	0	40	4	0	0	0	0	0	0
18	Manistee—*J. K.*	5	80	2	0	0	0	0	0	0	100	5	0	0	0	0	20	8	0	0	0	0	40	3	0	0	0	0	0	0
19	NORTH-EASTERN DIV. †	5	100	3	0	0	0	0	0	0	60	7	0	0	0	0	0	0	20	6	40	8	60	6	0	0	0	0	0	0
20	Alpena—W. P. M.	5	100	3	0	0	0	0	0	0	60	7	0	0	0	0	0	0	20	6	40	8	60	6	0	0	0	0	0	0
21	WESTERN DIVISION †	25	88	4	0	0	0	0	100	10	100	7	20	7	67	5	40	4	20	6	70	9	80	4	100	4	20	6	0	0
22	Grand Haven—*A. V.*	5	100	3	0	0	0	0	0	0	0	0	0	0	0	0	60	5	20	6	40	7	0	0	0	0	20	6	0	0
23	Grand Rapids—A. H.	5	100	3	0	0	0	0	0	0	100	5	20	7	80	6	0	0	0	0	0	0	60	6	100	2	0	0	0	0
24	Holland—*B. L.*	5	60	4	0	0	0	0	0	0	0	0	0	0	100	2	20	2	0	0	0	0	60	3	100	2	0	0	0	0
25	Ludington—*A. P. M.*	5	80	2	0	0	0	0	0	0	0	0	0	0	20	7	0	0	0	0	0	0	100	4	0	0	0	0	0	0
26	Muskegon—*O. C. W.*	5	100	6	0	0	0	0	100	10	100	9	0	0	0	0	0	0	0	0	100	11	100	2	100	9	0	0	0	0
27	NORTH'N-CENTR'L DIV. †	5	60	3	40	4	----	----	----	----	----	----	----	----	60	4	----	----	----	----	60	5	60	3	20	4	----	----	----	----
28	Big Rapids—*I. W. B.*	5	60	3	40	4	----	----	----	----	----	----	----	----	60	4	----	----	----	----	60	5	60	3	20	4	----	----	----	----
29	BAY-AND-EAST'N DIV. †	45	98	2	0	0	20	9	0	0	78	6	36	6	68	7	60	6	20	6	96	6	91	2	83	6	40	9	60	6
30	Bay City—W. H. B.	5	100	1	0	0	0	0	0	0	100	8	0	0	40	12	0	0	0	0	100	9	100	3	100	11	0	0	0	0
31	Bay City—W. R. M.	5	100	3	0	0	0	0	0	0	100	5	40	6	60	6	0	0	0	0	0	0	100	1	100	5	0	0	0	0

32	Port Huron—S. W. S.	5	100	2	0	0	0	0	0	0	100	8	0	0	100	7	0	0	0	0	100	6	100	4	100	6	0	0	0	0
33	Port Huron—A. A. W.	5	100	3	0	0	0	0	0	0	100	4	40	6	0	0	20	6	0	0	0	0	100	1	100	2	0	0	20	4
34	Port Sanilac—J. M. L.	5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	20	2	----	----	----	----	----	----
35	Saginaw City—N. D. L.	5	100	3	0	0	0	0	0	0	80	6	0	0	0	0	0	0	0	0	100	5	100	1	0	0	0	0	80	6
36	Saginaw City—I. N. S.	5	100	2	0	0	20	9	0	0	100	7	40	10	80	7	100	7	20	9	100	8	100	3	80	9	40	9	60	10
37	Thornville—J. S. C.	5	100	3	0	0	0	0	0	0	20	7	40	6	0	0	60	5	0	0	0	0	100	2	0	0	0	0	100	6
38	W. Bay City—J. W. H.	5	80	1	0	0	0	0	0	0	20	4	20	2	60	2	0	0	20	2	80	4	100	2	20	3	0	0	40	4
39	CENTRAL DIVISION.†	59	86	3	0	0	100	9	75	9	100	5	29	7	93	5	63	6	0	0	42	5	72	4	74	4	40	8	50	7
40	Charlotte—G. B. A.	5	100	2	0	0	100	9	0	0	100	11	0	0	100	11	100	6	0	0	0	0	100	4	100	7	40	8	80	10
41	DeWitt—G. W. T.	5	100	2	0	0	0	0	0	0	100	5	0	0	100	1	0	0	0	0	20	5	40	5	0	0	0	0	0	0
42	Flint—J. B. F. C.	4	100	4	0	0	0	0	75	9	100	5	25	9	75	7	100	7	0	0	100	8	100	5	75	8	0	0	25	9
43	Hastings—A. P. D.	5	0	0	0	0	0	0	0	0	100	4	0	0	80	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
44	Howell—C. V. B.	5	100	3	0	0	0	0	0	0	100	5	0	0	0	0	20	6	0	0	0	0	80	2	0	0	0	0	0	0
45	Hubbardston—H. W. B.	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	3	20	4	0	0	0	0
46	Ionia—S. V. R.	5	40	4	0	0	0	0	0	0	100	4	0	0	0	0	0	0	0	0	0	0	100	2	100	3	0	0	0	0
47	North Lansing—O. M.	5	100	3	0	0	0	0	0	0	100	2	20	7	100	3	40	6	0	0	60	4	100	3	0	0	0	0	0	0
48	Otisville—A. W. N.	5	100	2	0	0	0	0	0	0	100	4	40	6	100	2	60	4	0	0	0	0	0	0	0	0	0	0	0	0
49	Ovid—O. B. C.	5	80	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	3	0	0	40	1
50	Vernon—D. C. H.	5	100	1	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	20	5	40	4	40	3	0	0	0	0
51	Webberville—R. B. S.	5	40	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	3	0	0	80	3	0	0	0	0
52	SOUTH-WESTERN DIV.†	30	84	3	0	0	0	0	0	0	87	4	50	6	60	4	20	8	0	0	80	5	88	3	27	3	0	0	100	4
53	Allegan—H. S. L.	5	100	1	0	0	0	0	0	0	100	5	20	7	80	5	0	0	0	0	0	0	100	3	20	4	0	0	0	0
54	Mattawan—T. H. B.	5	0	0	0	0	0	0	0	0	100	4	0	0	60	3	0	0	0	0	40	4	0	0	0	0	0	0	0	0
55	Niles—O. P. H.	5	100	4	0	0	0	0	0	0	100	3	80	4	0	0	0	0	0	0	100	3	100	2	0	0	0	0	100	4
56	Niles—J. S. R.	5	100	5	0	0	0	0	0	0	100	7	0	0	0	0	20	8	0	0	100	7	100	4	20	4	0	0	0	0
57	Otsego—M. C.	5	20	2	0	0	0	0	0	0	100	4	0	0	20	4	0	0	0	0	0	0	100	1	0	0	0	0	0	0
58	St. Joseph—R. F. S.	5	100	1	0	0	0	0	0	0	20	3	0	0	80	3	0	0	0	0	0	0	40	3	40	2	0	0	0	0
59	SOUTH'N-CENTR'L DIV.†	75	91	2	80	10	0	0	20	4	92	7	32	6	63	5	50	8	60	11	56	7	78	3	70	5	0	0	80	9
60	Adrian—R. S.	5	100	1	0	0	0	0	20	4	80	5	0	0	60	2	40	7	0	0	0	0	100	4	0	0	0	0	0	0
61	Albion—J. P. S.	5	100	4	0	0	0	0	0	0	100	7	0	0	0	0	40	11	60	11	100	7	100	4	100	5	0	0	0	0
62	Brooklyn—E. N. P.	5	60	4	0	0	0	0	0	0	0	0	0	0	60	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
63	Clinton—A. W. A.	5	100	3	80	10	0	0	0	0	100	8	40	6	80	10	0	0	0	0	100	10	40	5	60	6	0	0	60	11
64	Coldwater—L. H. W.*	5	100	3	0	0	0	0	0	0	20	6	0	0	40	5	20	5	0	0	0	0	100	4	60	4	0	0	0	0
65	Hillsdale—A. C.	5	100	2	0	0	0	0	0	0	100	6	20	4	60	4	0	0	0	0	40	4	20	2	20	5	0	0	100	5
66	Jackson (State P.) E. L. K.	5	100	1	----	----	----	----	----	----	100	4	----	----	----	----	----	----	----	----	----	----	100	3	----	----	----	----	----	----
67	Jackson—W. W.	5	100	1	----	----	----	----	----	----	100	5	----	----	100	6	----	----	----	----	----	----	----	----	----	----	----	----	----	----
68	Kalamazoo—W. B. S.	5	80	4	0	0	0	0	0	0	100	11	20	10	40	10	0	0	0	0	0	0	100	1	100	3	0	0	80	10
69	Marshall—H. L. J.*	5	100	1	0	0	0	0	0	0	100	7	0	0	0	0	0	0	0	0	0	0	100	5	100	6	0	0	0	0
70	Mendon—H. C. C.	5	100	1	0	0	0	0	0	0	100	7	60	7	0	0	0	0	0	0	20	7	100	4	100	3	0	0	0	0
71	Mendon—E. S.	5	100	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	2	40	2	0	0	0	0
72	Sturgis—N. I. P.	5	100	2	0	0	0	0	0	0	100	4	20	5	0	0	0	0	0	0	20	6	40	3	20	3	0	0	0	0
73	Three Rivers—C. W. B.	5	100	1	0	0	0	0	0	0	100	11	0	0	0	0	100	8	0	0	0	0	100	3	100	8	0	0	0	0
74	Ypsilanti—E. B.*	5	20	4	0	0	0	0	0	0	0	0	0	0	60	3	0	0	0	0	0	0	80	2	0	0	0	0	0	0
75	SOUTH-EASTERN DIV.†	50	94	3	80	11	0	0	0	0	95	6	60	10	87	6	72	10	90	16	88	10	91	5	80	7	87	9	100	11
76	Detroit—E. L.	5	100	4	80	11	0	0	0	0	100	7	100	8	100	9	100	13	100	14	100	12	100	4	100	4	100	10	100	9
77	Detroit—L. C.	5	100	3	0	0	0	0	0	0	100	8	40	18	100	10	100	14	80	17	100	15	100	5	100	11	0	0	100	13
78	Detroit—W. H. R.	5	100	3	0	0	0	0	0	0	100	7	100	15	100	7	100	14	0	0	100	11	100	12	100	9	100	13	0	0
79	Milford—R. J.	5	100	2	0	0	0	0	0	0	0	0	0	0	80	4	0	0	0	0	40	5	100	1	0	0	0	0	0	0
80	Northville—J. M. S.	5	40	4	----	----	----	----	----	----	----	----	40	4	100	2	----	----	----	----	----	----	----	----	----	----	----	----	----	----
81	Pontiac—W. G. E.	5	100	4	0	0	0	0	0	0	100	7	60	7	0	0	0	0	0	0	0	0	100	6	0	0	0	0	0	0
82	Utica—G. G. R.	5	100	3	0	0	0	0	0	0	100	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
83	Washington—A. Y.	5	100	1	0	0	0	0	0	0	100	4	0	0	0	0	20	3	0	0	100	5	60	5	20	5	0	0	0	0
84	Wyandotte—E. P. C.	5	100	2	0	0	0	0	0	0	60	3	0	0	0	0	40	4	0	0	0	0	80	3	0	0	60	3	0	0
85	Wyandotte—T. J. L.	5	100	1	0	0	0	0	0	0	100	7	20	8	40	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0

*, †, ‡, §, ‖. For explanations and references, see foot-notes on pages 390-1. A fuller summary is given on pages 372-383.

[a] Includes 33 reports received from the North-Eastern Division for only eight months of the year.

TABLE 3.—*Diseases by Localities in Mich., for Year 1879 and for the Five Weeks ending* **February** *1, 1879.*—CONTINUED.

LINE NUMBER. ¶	Influenza.		Measles.		Neuralgia.		Pneumonia.		Puerperal Fever.		Rheumatism.		Scarlatina.		Small-pox.		Tonsilitis.		Whooping-Cough.	
	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present ‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.§	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§
1	78	3.1	68	4.7	78	4.5	69	5.2	40	7.2	84	4.6	64	5.5	38	10.6	67	4.5	72	5.5
2	78	1.9	26	5.4	81	3.6	61	4.6	41	6.5	77	4.1	69	4.0	0	0	70	3.0	75	2.7
3	61	3.0	38	3.0	56	3.7	53	2.8	31	4.7	79	3.8	67	2.0	0	0	48	3.8	53	4.0
4	75	3.5	68	5.1	80	5.0	67	5.0	41	7.0	84	6.1	63	6.5	0	0	68	5.0	75	6.5
5	25	2.5	25	4.0	60	3.7	58	3.0	0	0	75	3.1	25	4.0	0	0	46	4.0	50	3.7
6	82	3.8	72	3.5	85	4.8	73	5.8	27	7.8	85	4.7	55	6.1	44	6.0	74	4.7	66	5.5
7	76	3.2	52	4.6	75	4.4	64	5.1	43	4.7	78	4.7	55	4.2	25	6.0	63	4.6	73	4.4
8	73	3.0	48	6.0	79	3.8	59	4.5	29	5.0	84	4.0	56	5.0	0	0	58	3.8	65	5.3
9	78	2.8	58	3.6	78	4.4	69	5.0	41	6.6	86	4.5	57	6.0	50	7.0	69	4.6	75	5.5
10	86	3.3	80	5.8	80	5.4	80	6.4	51	11.6	91	4.7	80	6.3	36	14.0	72	5.3	82	9.0
11	81	2.1	62	5.2	73	4.9	76	4.7	44	7.0	86	4.3	58	5.4	0	0	70	3.9	77	5.1
12	87	1	20	6	100	4	87	5	0	0	93	4	60	5	0	0	90	3	100	3
13	100	1	----	----	100	4	100	5	----	----	100	5	100	5	----	----	80	4	----	----
14	80	1	20	6	100	4	60	6	0	0	100	3	0	0	0	0	100	2	0	0
15	80	2	20	5	----	----	100	4	0	0	80	5	20	4	0	0	----	----	100	3
16	60	3	0	0	60	5	60	4	0	0	90	4	80	1	0	0	40	5	60	3
17	0	0	0	0	80	4	100	2	0	0	80	4	80	1	0	0	60	2	20	4
18	60	3	0	0	40	6	20	5	0	0	100	4	0	0	0	0	20	7	100	1
19	100	1	100	4	100	5	80	7	20	5	100	4	0	0	0	0	100	2	100	3
20	100	1	100	4	100	5	80	7	20	5	100	4	0	0	0	0	100	2	100	3
21	95	1	100	1	65	6	70	5	0	0	84	6	50	6	0	0	55	6	100	3
22	100	2	0	0	20	8	100	3	0	0	100	6	20	7	----	----	40	8	100	2
23	100	1	0	0	40	6	0	0	0	0	20	7	60	6	0	0	60	5	100	4
24	80	1	0	0	----	----	40	4	0	0	100	3	0	0	0	0	----	----	0	0
25	0	0	100	1	100	5	40	5	0	0	100	3	20	4	0	0	20	7	0	0
26	100	1	0	0	100	5	100	7	0	0	100	10	100	5	0	0	100	4	0	0
27	----	----	----	----	----	----	100	3	----	----	100	4	----	----	----	----	40	4	100	1
28	----	----	----	----	----	----	100	3	----	----	100	4	----	----	----	----	40	4	100	1
29	85	3	60	5	80	5	89	6	0	0	89	4	30	7	0	0	87	4	65	5
30	100	4	0	0	100	7	100	10	0	0	100	5	0	0	0	0	100	6	100	3
31	100	3	0	0	----	----	100	5	0	0	100	6	0	0	0	0	----	----	100	4
32	100	1	0	0	100	4	100	5	0	0	100	5	0	0	0	0	100	3	20	7
33	20	5	40	6	40	7	60	6	0	0	100	5	40	7	0	0	0	0	40	6
34	80	2	80	1	20	4	80	3	----	----	20	4	----	----	----	----	20	5	----	----
35	80	4	0	0	100	2	80	6	0	0	100	4	20	7	0	0	100	3	0	0
36	100	6	60	7	100	5	100	8	0	0	100	4	40	11	0	0	100	2	0	0
37	100	1	0	0	100	5	80	7	0	0	80	4	0	0	0	0	100	6	0	0

	DISEASES REPORTED WHICH WERE NOT PRINTED ON THE BLANKS, AMOUNT OF SICKNESS, ETC. ¶	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§
13	Catarrhal gastritis	40	2
	Chicken-pox	20	5
	Gastro-hepatic catarrh	20	2
	Catarrhal inflammation very prevalent, Jan. 11. Influenza and catarrhal inflammations very severe, Jan. 18. Diarrhœa, catarrhal, 3 weeks ending Feb. 1.		
14	Parotiditis	20	1
15	Eclampsia	20	7
	Typho-rheumatic fever	20	4
20	Nephritis	20	9
22	Enteritis	20	11
24	Fever, nervous	60	4
28	Spasmodic croup	20	6
	See note 28 for January, page 395.		
31	See note 31 for January, page 395.		
33	Everything mild, and not much of it at that, Jan. 4. Still mild, Jan. 11.		
34	Parotitis	20	3
36	Cases all easily controlled, Jan. 18.		
41	Dropsy and synovitis, each	40	5
	Insanity and metrorrhagia, each	80	5
	Necrosis	60	5
	Paresis	20	5
	Scrofula	20	5
42	Spasmodic croup	50	8
43	Mumps	100	2
44	Diphtheria still prevails at Fowlerville, Jan. 4. Diphtheria on the wane at Fowlerville, Jan. 11.		
45	Pharyngitis	20	1
50	Gastric catarrh	20	5
	Diagnosis of scarlatina doubtful, Jan. 4. Epidemic catarrh of an adynamic character (influenza) greatly increased, Jan. 25.		
51	An epidemic of influenza, Jan. 25.		
54	Pseudo-croup, paralysis, acute nephritis, and globus hysteria, each	20	5
	Fungus hæmatodes and cancer of stomach, each	40	6
	Cancerous ----, of various kinds	20	1

38	0	0	0	0	----	----	100	2	0	0	100	2	20	4	0	0	----	----	0	0
39	*80*	*2*	*0*	*0*	*68*	*4*	*61*	*5*	*58*	*6*	*78*	*4*	*56*	*5*	*0*	*0*	*65*	*4*	*68*	*6*
40	100	1	0	0	40	6	100	7	0	0	100	4	0	0	0	0	20	3	0	0
41	0	0	0	0	100	3	80	4	100	5	100	4	60	4	0	0	100	3	0	0
42	100	2	0	0	100	3	75	8	25	9	100	4	75	8	0	0	100	3	50	10
43	80	2	0	0	----	----	40	3	0	0	0	0	0	0	0	0	----	----	20	4
44	100	1	0	0	----	----	0	0	0	0	100	5	100	6	0	0	----	----	100	6
45	60	1	0	0	0	0	20	6	0	0	40	4	20	2	0	0	0	0	0	0
46	100	2	0	0	0	0	20	6	0	0	0	0	0	0	0	0	0	0	0	0
47	100	1	0	0	20	5	80	4	40	4	100	5	40	4	0	0	20	6	0	0
48	80	1	0	0	80	4	80	5	0	0	100	5	0	0	0	0	20	4	100	4
49	20	4	0	0	----	----	60	2	0	0	20	3	60	3	0	0	----	----	0	0
50	40	1	0	0	100	3	100	2	0	0	100	3	40	5	0	0	100	4	0	0
51	100	1	0	0	40	4	20	3	60	4	20	4	0	0	0	0	100	2	0	0
52	*63*	*3*	*0*	*0*	*67*	*2*	*65*	*5*	*0*	*0*	*87*	*3*	*40*	*3*	*0*	*0*	*60*	*3*	*0*	*0*
53	20	7	0	0	60	2	60	6	0	0	100	2	0	0	0	0	40	7	0	0
54	60	3	0	0	60	2	60	3	0	0	100	2	60	1	----	----	40	1	----	----
55	100	1	0	0	80	3	100	3	0	0	100	4	0	0	0	0	80	3	----	----
56	100	2	0	0	----	----	40	9	0	0	100	6	0	0	0	0	80	3	0	0
57	20	1	0	0	----	----	0	0	0	0	100	2	20	4	0	0	20	4	0	0
58	20	2	0	0	----	----	0	0	0	0	20	3	0	0	0	0	100	2	----	----
59	*75*	*2*	*0*	*0*	*78*	*5*	*77*	*4*	*60*	*13*	*84*	*5*	*64*	*7*	*0*	*0*	*75*	*4*	*86*	*5*
60	40	2	0	0	80	5	20	4	0	0	100	5	80	5	0	0	0	0	100	3
61	100	2	0	0	60	5	100	8	----	----	100	6	100	11	0	0	40	1	80	11
62	0	0	0	0	0	0	80	3	0	0	100	2	60	4	----	----	60	2	40	1
63	80	3	0	0	100	9	100	3	60	13	100	9	20	12	0	0	100	10	100	1
64	0	0	0	0	60	4	100	4	0	0	100	2	0	0	0	0	100	1	0	0
65	40	2	0	0	100	3	80	5	0	0	100	5	40	6	0	0	80	2	0	0
66	----	----	----	----	----	----	----	----	----	----	100	3	----	----	----	----	100	4	----	----
67	100	1	----	----	----	----	100	2	----	----	80	3	40	7	----	----	100	2	100	5
68	100	2	0	0	0	0	80	6	0	0	60	8	100	8	0	0	100	4	100	7
69	100	2	0	0	----	----	60	3	0	0	100	3	20	7	0	0	----	----	0	0
70	60	5	0	0	100	5	100	2	0	0	100	6	40	8	0	0	80	6	80	5
71	40	1	0	0	----	----	60	2	0	0	20	2	0	0	0	0	----	----	0	0
72	0	0	0	0	100	4	100	1	0	0	20	6	0	0	0	0	40	4	0	0
73	100	3	0	0	80	6	80	9	0	0	100	5	100	10	0	0	80	6	0	0
74	60	4	0	0	20	4	20	3	0	0	0	0	100	1	0	0	20	2	0	0
75	*96*	*2*	*70*	*9*	*68*	*6*	*82*	*5*	*20*	*8*	*87*	*4*	*70*	*4*	*0*	*0*	*75*	*4*	*53*	*11*
76	100	1	0	0	100	9	100	6	20	6	100	4	100	2	0	0	100	5	40	10
77	100	4	100	11	100	6	100	10	20	10	100	5	100	4	0	0	100	7	100	12
78	100	1	0	0	100	9	100	5	0	0	100	8	100	4	0	0	100	2	0	0
79	60	2	0	0	40	5	40	4	0	0	0	0	20	6	0	0	20	4	0	0
80	100	1	----	----	----	----	20	3	----	----	60	2	----	----	----	----	----	----	----	----
81	100	1	40	6	----	----	100	3	0	0	100	2	40	5	0	0	----	----	0	0
82	100	1	0	0	40	6	100	4	0	0	100	4	80	4	0	0	80	2	0	0
83	100	4	0	0	100	3	80	5	0	0	100	1	0	0	0	0	80	5	0	0
84	100	1	0	0	40	4	0	0	0	0	20	3	80	2	0	0	20	1	0	0
85	100	2	0	0	20	6	100	4	0	0	100	4	40	5	0	0	100	6	20	10

56	Pharyngitis simplex	100	1
57	Very little sickness, Jan. 4. Water very low in wells and in river, Jan. 11.		
58	No sickness, Jan. 4.		
61	Pharyngitis	60	2
	Very little sickness; the cases of scarlatina are 8 miles north of village, Jan. 4.		
63	Pleurisy	20	10
64	A few cases of diphtheria reported, am not certain as to diagnosis, Jan. 4.		
65	Cynanche	20	1
	Inflammation of fauces, often extending to trachea and bronchia, Jan. 11. Two cases of Bright's disease, acute, Feb. 1.		
66	Syphilis	100	6
67	Laryngitis	100	2
	A marked increase of sickness last week and this, pulmonary and throat troubles, Jan. 29.		
70	Cystitis	60	8
	Hepatitis	20	5
71	Spinal anemia, Jan. 4.		
	Pharyngitis	20	2
73	Pharyngitis	100	3
	Paralysis	20	8
	Canker sore throat	60	7
	Not very sickly, 5 weeks ending Feb. 1.		
74	Scarlatina of a mild form, Jan. 4. Tonsilitis prevalent; mild cases of scarlatina prevalent; cerebral tendency in disease, Jan. 11. Scarlatina complicated with diphtheria has appeared, Jan. 18. Scarlatina seems more fatal amongst the better class of society; complications of diphtheria are always fatal, Jan. 25.		
76	Parotiditis	60	10
77	Otitis media	20	18
	Diphtheria marked spurious, Jan. 25. Puerperal fever seemed to be the result of the exhaustion following the long cold weather, Feb. 1.		
78	Genuineness of croup and diphtheria questioned.		
	Chicken-pox	80	16
	See note 78 for January, page 397.		
80	"Rheumatic fever"	20	3
	See note 80 for January, page 399.		
82	Dyspepsia	20	2
83	Dyspepsia	100	2
	Pharyngitis	80	4
	Paralysis	80	6
	Pleuritis	40	5
84	See note 84 for January, page 399.		

"Aged people and children have appeared to suffer from their peculiar forms of weakness to an unusual degree this month. A form of pleurisy or pneumonia has been prevalent this month among children. Of 8 cases known to me 3 proved fatal. There were doubtless cases among the foreign and catholic population of which I did not hear. The trouble went by the name of 'lung fever.' Three adults and perhaps more have been sick with same complaint. *Mumps* also have prevailed generally; otherwise the health of the place is good."—*Rev. A. W. Bill, of Menominee, Feb. 1, 1879* (*on Jan. Meteorological Register.*)

‡ § For explanations and references, see pages 390–1. A fuller summary is given on pages 372–383.

¶ The several numbered lines on pages 388–9 continue statements for the localities and divisions which are named and have the same line-numbers on pages 386–7. On the right of the page the numbers before the notes are the line-numbers of the localities, on pages 386–7, to which the side-notes refer.

TABLE 3.—CONTINUED.—*Diseases, by Localities in Michigan, Four Weeks ending* **March** *1, 1879.*

Line Number.	Divisions and Localities Represented, and Initials of Physicians who Reported*. (Health Officers in italics; those also Correspondents marked with a *.)	Reports Received.	Bronchitis.		Cerebro-Spinal Men'gitis.		Cholera Infantum.		Cholera Morbus.		Consumption, Pulmonary.		Croup, Membraneous.		Diphtheria.		Diarrhea.		Dysentery.		Erysipelas.		Fever, Intermittent.		Fever, Remittent.		Fever, Typhoid (Enteric).		Fever, Typho-Malarial.	
			Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§
1	ALL LOCALITIES‖	250	94	2.4	75	8.3	55	7.0	41	7.2	91	5.9	45	7.3	69	6.1	61	6.5	50	8.8	59	7.3	87	3.9	81	4.9	75	9.8	67	7.2
2	UPPER PENIN. DIV. †	10	70	3	0	0	0	0	0	0	100	4	50	5	0	0	67	5	0	0	60	5	0	0	0	0	0	0	0	0
3	Houghton—H. W. J.	3	100	1	0	0	0	0	0	0	100	4	33	5	0	0	67	5	0	0	33	6	0	0	0	0	0	0	0	0
4	Ishpeming—*W. T. C.* *	4	50	3	0	0	0	0	0	0	100	5	0	0	0	0	0	0	0	0	50	6	0	0	0	0	0	0	0	0
5	Negaunee—*A. C. M.*	3	67	4	0	0	0	0	0	0	100	4	67	4	0	0	0	0	0	0	100	4	0	0	0	0	0	0	----	----
6	NORTH WESTERN DIV.†	7	100	3	0	0	0	0	0	0	100	9	25	10	75	5	50	7	0	0	50	7	100	6	0	0	0	0	0	0
7	Cadillac—*J. M. W.*	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	Manistee—*J. K.*	4	100	3	0	0	0	0	0	0	100	9	25	10	75	5	50	7	0	0	50	7	100	6	0	0	0	0	0	0
9	NORTH EASTERN DIV.†	4	100	2	0	0	0	0	0	0	25	7	0	0	0	0	0	0	0	0	50	6	50	5	0	0	0	0	0	0
10	Alpena—W. P. M.	4	100	2	0	0	0	0	0	0	25	7	0	0	0	0	0	0	0	0	50	6	50	5	0	0	0	0	0	0
11	WESTERN DIV.†	20	85	3	0	0	25	4	50	8	100	7	0	0	75	8	0	0	25	4	63	7	81	5	100	4	50	4	50	4
12	Grand Haven—A. V.	4	100	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	8	0	0	0	0	0	0	0	0
13	Grand Rapids—A. H.	4	100	3	0	0	0	0	25	7	100	5	0	0	50	7	0	0	0	0	0	0	100	6	100	2	0	0	0	0
14	Holland—*B. L.*	4	25	3	0	0	25	4	0	0	0	0	0	0	100	4	0	0	25	4	100	4	25	4	100	2	50	4	50	4
15	Ludington—*A. P. M.*	4	100	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	4	100	4	0	0	0	0	0	0
16	Muskegon—*O. C. W.*	4	100	4	0	0	0	0	75	9	100	9	0	0	75	12	0	0	0	0	100	11	100	5	100	9	0	0	0	0
17	NORTH'N-CENTR'L DIV.†	4	75	2	0	0	0	0	0	0	0	0	0	0	100	3	25	4	0	0	0	0	0	0	0	0	0	0	0	0
18	Big Rapids—*I. W. B.*	4	75	2	0	0	0	0	0	0	0	0	0	0	100	3	25	4	0	0	0	0	0	0	0	0	0	0	0	0
19	BAY AND EAST'N DIV.†	36	100	2	0	0	50	6	0	0	86	6	31	6	71	6	88	6	0	0	75	6	100	3	71	6	50	11	38	9
20	Bay City—W. H. B.	4	100	1	0	0	0	0	0	0	100	7	0	0	75	12	0	0	0	0	100	8	100	4	100	11	0	0	0	0
21	Bay City—W. R. M.	4	100	2	0	0	0	0	0	0	100	5	0	0	75	6	0	0	0	0	0	0	100	2	50	5	0	0	0	0
22	Port Huron—*S. W. S.*	4	100	2	0	0	0	0	0	0	100	7	25	7	100	6	0	0	0	0	25	7	100	5	50	6	0	0	0	0
23	Port Huron—A. A. W.	4	100	3	0	0	50	6	0	0	100	7	0	0	25	7	0	0	0	0	0	0	100	2	100	1	0	0	0	0
24	Port Sanilac—J. M. L.	4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
25	Saginaw City—N. D. L.	4	100	3	0	0	0	0	0	0	25	5	25	5	75	4	0	0	0	0	100	5	100	1	0	0	0	0	0	0
26	Saginaw City—*I. N. S.*	4	100	3	0	0	0	0	0	0	75	8	50	9	75	7	100	8	0	0	100	8	100	2	75	7	50	11	25	11
27	Thornville—J. S. C.	4	100	3	0	0	0	0	0	0	100	6	0	0	0	0	75	3	0	0	0	0	100	2	0	0	0	0	50	6
28	W. Bay City—*J. W. H.*	4	100	2	0	0	0	0	0	0	0	0	25	2	75	2	0	0	0	0	50	3	100	2	50	3	0	0	0	0
29	CENTRAL DIV.†	50	88	2	0	0	100	11	40	8	90	5	50	5	77	5	41	5	0	0	57	7	88	4	88	4	0	0	57	8
30	Charlotte—G. B. A.	3	100	2	0	0	100	11	67	10	100	14	0	0	100	11	100	7	0	0	0	0	100	4	100	8	0	0	100	11
31	DeWitt—G. W. T.	4	100	1	0	0	0	0	0	0	100	5	0	0	50	3	25	5	0	0	0	0	100	5	0	0	0	0	0	0
32	Elsie—E. B. T.	4	25	4	0	0	0	0	0	0	25	5	0	0	0	0	0	0	0	0	0	0	100	3	0	0	0	0	0	0
33	Flint—*J. B. F. C.*	3	100	3	0	0	0	0	33	7	100	6	0	0	67	8	67	7	0	0	100	8	100	3	100	6	0	0	0	0
34	Hastings—A. P. D.	4	0	0	0	0	0	0	0	0	100	3	0	0	75	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35	Howell—C. V. B.	4	100	1	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	100	6	0	0	0	0	0	0
36	Hubbardston—H. W. B.	4	0	0	0	0	0	0	0	0	75	8	0	0	0	0	0	0	0	0	0	0	100	3	100	4	0	0	0	0
37	Ionia—*S. V. R.*	4	50	5	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	0	0	100	2	100	3	0	0	0	0

38	North Lansing—O. M.	4	100	2	0	0	0	0	0	0	100	2	50	5	100	4	25	4	0	0	25	5	100	3	0	0	0	0	0	0
39	Otisville—A. W. N.	4	100	2	0	0	0	0	25	6	100	4	0	0	75	3	25	4	0	0	0	0	25	4	0	0	0	0	0	0
40	Ovid—O. B. C.	4	100	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75	2	0	0	25	4
41	Vernon—D. C. H.	4	100	1	----	----	----	----	----	----	100	4	----	----	----	----	----	----	----	----	----	----	100	4	75	4	----	----	----	----
42	Webberville—R. B. S.	4	100	1	0	0	0	0	0	0	0	0	0	0	0	0	25	3	0	0	0	0	50	3	75	2	0	0	0	0
43	SOUTH-WESTERN DIV.†	*23*	*91*	*3*	*0*	*0*	*0*	*0*	*0*	*0*	*100*	*5*	*75*	*7*	*53*	*4*	*38*	*5*	*0*	*0*	*64*	*5*	*81*	*5*	*50*	*3*	*0*	*0*	*75*	*5*
44	Allegan—H. S. L.	4	100	1	0	0	0	0	0	0	100	6	75	7	50	8	0	0	0	0	0	0	75	6	0	0	0	0	0	0
45	Mattawan—T. H. B.	3	67	5	0	0	0	0	0	0	100	5	0	0	67	3	0	0	0	0	33	4	0	0	0	0	0	0	0	0
46	Niles—*O. P. H.*	4	100	4	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	100	3	100	2	0	0	0	0	100	3
47	Niles—J. S. R.	4	100	3	0	0	0	0	0	0	100	6	0	0	0	0	50	8	0	0	50	8	50	9	25	4	0	0	50	6
48	Otsego—M. C.	4	100	2	0	0	0	0	0	0	100	4	0	0	25	3	0	0	0	0	0	0	100	3	0	0	0	0	0	0
49	St. Joseph—R. B. S.	4	75	1	0	0	0	0	0	0	0	0	0	0	75	2	25	1	0	0	0	0	0	0	75	2	0	0	0	0
50	SOUTH'N-CENTR'L DIV.†	*56*	*100*	*2*	*63*	*7*	*0*	*0*	*0*	*0*	*93*	*7*	*25*	*8*	*40*	*6*	*75*	*6*	*75*	*10*	*38*	*8*	*81*	*4*	*75*	*5*	*0*	*0*	*75*	*8*
51	Adrian—R. S.	4	100	2	0	0	0	0	0	0	100	3	0	0	75	3	100	4	0	0	0	0	100	2	0	0	0	0	25	4
52	Albion—J. P. S.	4	100	1	0	0	0	0	0	0	100	6	0	0	25	12	25	8	75	10	100	8	100	3	100	5	0	0	0	0
53	Brooklyn—E. N. P.	4	100	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	2	25	3	0	0	0	0
54	Clinton—A. W. A.	4	100	4	100	9	0	0	0	0	100	11	25	9	25	7	0	0	0	0	25	14	25	10	100	7	0	0	100	11
55	Coldwater—*L. H. W.**	4	100	3	0	0	0	0	0	0	100	6	0	0	0	0	75	3	0	0	0	0	100	5	100	4	0	0	0	0
56	Jackson (State P.) E.L.K.	4	100	1	----	----	----	----	----	----	100	4	----	----	----	----	----	----	----	----	25	7	100	2	----	----	----	----	----	----
57	Jackson—W. W.	4	100	1	----	----	----	----	----	----	100	5	----	----	25	7	----	----	----	----	----	----	----	----	----	----	----	----	----	----
58	Kalamazoo—W. B. S.	4	100	3	0	0	0	0	0	0	100	10	0	0	0	0	0	0	0	0	0	0	100	2	100	4	0	0	100	9
59	Marshall—*H. L. J.**	4	100	2	0	0	0	0	0	0	25	7	0	0	0	0	0	0	0	0	0	0	25	5	25	6	0	0	0	0
60	Mendon—H. C. C.	4	100	1	0	0	0	0	0	0	100	6	25	8	0	0	0	0	0	0	0	0	100	4	100	4	0	0	0	0
61	Mendon—E. S.	4	100	1	25	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	4	100	2	0	0	0	0	0	0
62	Sturgis—N. I. P.	4	100	3	0	0	0	0	0	0	100	5	25	7	0	0	0	0	0	0	25	6	100	4	25	3	0	0	0	0
63	Three Rivers—C. W. B.	4	100	1	0	0	0	0	0	0	100	11	0	0	0	0	100	9	0	0	25	11	100	3	100	7	0	0	0	0
64	Ypsilanti—*E. B.**	4	----	----	0	0	0	0	0	0	0	0	0	0	50	2	0	0	0	0	0	0	75	2	0	0	0	0	0	0
65	SOUTH-EASTERN DIV.†	*40*	*100*	*3*	*100*	*12*	*0*	*0*	*25*	*4*	*92*	*6*	*75*	*11*	*83*	*8*	*80*	*11*	*50*	*10*	*70*	*11*	*91*	*5*	*100*	*8*	*100*	*12*	*83*	*8*
66	Detroit—E. L.	4	100	3	100	12	0	0	0	0	100	5	100	8	100	9	100	14	100	15	100	13	100	3	100	2	100	10	100	9
67	Detroit—L. C.	4	100	3	0	0	0	0	0	0	100	5	0	0	100	16	100	14	50	16	100	15	100	2	100	14	0	0	100	11
68	Detroit—W. H. R.	4	100	3	0	0	0	0	0	0	100	7	100	16	100	7	100	13	0	0	100	12	100	9	100	7	100	14	0	0
69	Milford—R. J.	4	100	3	0	0	0	0	0	0	25	4	0	0	25	6	0	[illegible]	25	4	25	5	100	1	0	0	0	0	50	5
70	Northville—J. M. S.	4	100	4	----	----	----	----	----	----	----	----	----	----	100	2	----	----	----	----	----	----	----	----	----	----	----	----	----	----
71	Pontiac—W. G. E.	4	100	2	0	0	0	0	0	0	100	7	0	0	0	0	0	0	0	0	0	0	100	5	0	0	0	0	0	0
72	Utica—G. G. R.	4	100	4	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
73	Washington—A. Y.	4	100	2	----	----	0	0	0	0	100	6	0	0	0	0	75	8	0	0	25	8	100	7	0	0	0	0	0	0
74	Wyandotte—E. P. C.	4	100	2	0	0	0	0	25	4	100	4	0	0	0	0	25	4	25	4	0	0	75	3	0	0	0	0	0	0
75	Wyandotte—*T. J. L.*	4	100	1	0	0	0	0	0	0	100	7	25	8	75	6	0	0	0	0	0	0	50	8	0	0	0	0	0	0

NOTE.—For comments on this table see page ; 367 for plan of marking the card reports see pages 367–8. Summaries made from this table are given on pages 386, 388, also in Tables 1 and 2, pages 372–383, and in Table 4 and Exhibits 24 and 25, on following pages.

* Health officer and correspondent. For names of observers, see Exhibit 23, pages 384–5.

† For counties in each division see Exhibit 1, page 227. The numbers in this line are an average for those localities, only, within the division, at which the disease was reported present at some time during the month.

‡ When less than the full number of reports for the month have been received from any Observer, the number against his name in the column "Per Cent of Weeks Present," for any disease, is the per cent which the number of weeks he reports the disease present is of the number of cards received from him. When less than 2 reports have been received from any Observer for a month of 4 weeks, or less than 3 for a month of 5 weeks, they have not been compiled. When for any week no statement has been made by an Observer, with regard to a disease, and for the other weeks it has been marked 0, the columns for that disease against his name have been left blank. For the purposes of this compilation, each month is made to end on the Saturday nearest the end of the calendar month. In compiling this table, a fraction less than one-half is rejected, a fraction equal to or greater than one-half is counted as one.

§ The disease of which there were the most cases was to be marked 1 in order, on the cards; that of which there was the next greatest number of cases, 2; and so on. Diseases not present were to be marked 0. This column states the average order of prevalence only for those weeks the disease was reported present.

‖ The numbers in this line are statements not for all the localities represented, but for those in which the disease was reported present.

TABLE 3.—*Diseases, by Localities in Michigan, Four Weeks ending* **March** *1, 1879*—CONTINUED.

LINE NUMBER. ¶	Influenza. Per cent of Weeks Present.‡	Influenza. Av. Order of Prevalence when Present.§	Measles. Per cent of Weeks Present.‡	Measles. Av. Order of Prevalence when Present.§	Neuralgia. Per cent of Weeks Present.‡	Neuralgia. Av. Order of Prevalence when Present.§	Pneumonia. Per cent of Weeks Present.‡	Pneumonia. Av. Order of Prevalence when Present.§	Puerperal Fever. Per cent of Weeks Present.‡	Puerperal Fever. Av. Order of Prevalence when Present.§	Rheumatism. Per cent of Weeks Present.‡	Rheumatism. Av. Order of Prevalence when Present.§	Scarlatina. Per cent of Weeks Present.‡	Scarlatina. Av. Order of Prevalence when Present.§	Small-pox. Per cent of Weeks Present.‡	Small-pox. Av. Order of Prevalence when Present.§	Tonsilitis. Per cent of Weeks Present.‡	Tonsilitis. Av. Order of Prevalence when Present.§	Whooping-Cough. Per cent of Weeks Present.‡	Whooping-Cough. Av. Order of Prevalence when Present.§
1	93	1.9	70	5.9	79	4.5	91	4.3	50	11.0	88	4.5	67	5.5	0	0	75	4.1	83	5.3
2	90	2	0	0	100	4	80	3	0	0	86	5	83	6	0	0	100	3	57	3
3	100	1	0	0	100	5	100	4	0	0	67	7	100	7	0	0	100	3	0	0
4	100	1	0	0	100	3	50	4	0	0	100	3	0	0	0	0	100	2	25	4
5	67	4	0	0	----	----	100	2	0	0	0	0	67	4	0	0	----	----	100	1
6	100	1	0	0	43	5	100	3	0	0	71	5	100	1	0	0	57	3	100	3
7	0	0	0	0	33	2	100	1	0	0	33	1	100	1	0	0	67	2	0	0
8	100	1	0	0	50	7	100	4	0	0	100	8	0	0	0	0	50	4	100	3
9	100	1	75	4	75	5	75	6	0	0	100	3	50	4	0	0	75	4	100	5
10	100	1	75	4	75	5	75	6	0	0	100	3	50	4	0	0	75	4	100	5
11	85	2	63	5	88	5	92	4	25	8	94	6	67	5	0	0	60	4	100	5
12	100	2	0	0	50	7	100	3	0	0	75	4	25	5	0	0	50	6	100	4
13	100	1	0	0	100	5	0	0	25	8	0	0	0	0	0	0	100	4	100	6
14	100	1	0	0	0	0	75	4	0	0	100	4	0	0	0	0	25	5	0	0
15	25	6	100	1	100	4	0	0	0	0	100	5	75	6	0	0	25	3	0	0
16	100	1	25	9	100	2	100	6	0	0	100	12	100	4	0	0	100	4	0	0
17	25	2	0	0	0	0	100	2	0	0	50	2	0	0	0	0	0	0	----	----
18	25	2	0	0	0	0	100	2	0	0	50	2	0	0	0	0	0	0	----	----
19	88	3	63	4	93	4	97	5	0	0	92	4	67	6	0	0	86	5	88	5
20	100	2	0	0	100	6	100	9	0	0	100	6	75	11	0	0	100	10	100	4
21	100	2	0	0	----	----	100	5	0	0	100	5	50	6	0	0	----	----	100	6
22	100	1	0	0	100	4	100	6	0	0	100	5	100	6	0	0	100	4	100	5
23	25	5	25	6	50	6	75	5	0	0	100	5	75	6	0	0	25	5	50	5
24	100	3	100	1	----	----	100	3	----	----	25	4	----	----	----	----	----	----	----	----
25	75	4	0	0	100	2	100	5	0	0	100	3	0	0	0	0	100	4	0	0
26	100	5	0	0	100	4	100	6	0	0	100	4	0	0	0	0	100	3	0	0
27	100	1	0	0	100	5	100	6	0	0	100	6	50	6	0	0	100	6	0	0
28	0	0	0	0	100	1	100	3	0	0	100	1	50	3	0	0	75	1	0	0
29	100	1	67	9	63	4	86	4	0	0	76	5	47	5	0	0	73	4	63	4
30	100	1	0	0	100	6	100	8	0	0	100	5	0	0	0	0	100	7	0	0
31	0	0	0	0	100	3	100	4	0	0	100	4	0	0	0	0	100	2	0	0
32	100	1	0	0	25	4	100	2	0	0	0	0	0	0	0	0	0	0	0	0
33	100	1	67	9	100	5	100	5	0	0	100	5	100	8	0	0	100	4	0	0
34	100	1	0	0	----	----	75	3	0	0	0	0	0	0	0	0	----	----	75	3
35	100	2	0	0	----	----	100	4	0	0	100	5	0	0	0	0	100	7	0	0
36	100	2	0	0	75	5	100	6	0	0	100	6	0	0	0	0	0	0	0	0
37	100	1	0	0	----	----	100	4	0	0	25	5	25	6	0	0	----	----	0	0
38	100	2	0	0	25	3	50	4	0	0	25	4	0	0	0	0	25	3	0	0
39	100	1	0	0	75	5	75	3	0	0	75	5	25	4	0	0	100	4	50	5

	DISEASES REPORTED WHICH WERE NOT PRINTED ON THE BLANKS, AMOUNT OF SICKNESS, ETC. ¶	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§
3	Croup	67	5
	Catarrhal gastritis	33	3
	Chicken-pox	67	4
	Ulcerative pharyngitis	33	2
	Diarrhea catarrhal, week ending Feb. 8.		
5	Typho-rheumatic fever	100	3
10	Epilepsy	25	3
14	Nervous fever	25	5
	Bilious fever	25	4
21	No changes, 2 weeks ending Feb. 15. No sickness, Feb. 8. Colds and coughs, sneezing and its mucous discharges accompanying, etc., Feb. 22. Respiratory organs in trouble; air passages inflamed, March 1.		
23	A little increase in sickness, but not severe; rather mild.—Feb. 15. Sickness mild.—Two weeks ending March 1.		
24	Parotitis	50	4
25	We have had a great deal more tonsilitis, laryngitis, pharyngitis, and influenza, accompanied with some diphtheria, than usual, all mixed up together, and some deaths reported from diphtheria. I report none as diphtheria unless I see the characteristic deposit, unless in families where I see that deposit in others. I had one family with scarlatina and diphtheria, Feb. 8.		
28	Epidemic sore throat.—Feb. 29.	25	1
	I report rheumatism in excess of other diseases for the past three weeks, and designate it *muscular*. It has so proven to be in all *my* cases, the basis of my reports. The respiratory and chest muscles have been principally involved, and in some cases to result in very marked dyspnœa. In none of them has there been any decided tendency to inflammation. The patients attacked have been male adults of out-door pursuits, and have attributed the commencement to "taking a bad cold."		
31	Apoplexy, paralysis, chronic albuminuria, and cancer, each	50	5
	Bright's disease and epilepsy, each	25	5
33	Spasmodic croup	33	7
34	Mumps	75	3

40	0	0	0	0	25	4	100	3	0	0	0	0	50	3	0	0	----	----	0	0
41	100	1	----	----	100	3	100	3	----	----	100	4	----	----	----	----	50	3	----	----
42	100	2	0	0	25	4	25	3	0	0	50	4	0	0	0	0	25	3	0	0
43	*96*	*2*	*0*	*0*	*73*	*2*	*89*	*4*	*0*	*0*	*96*	*3*	*0*	*0*	*0*	*0*	*70*	*4*	*0*	*0*
44	100	5	0	0	100	2	100	3	0	0	100	3	0	0	0	0	50	8	0	0
45	100	1	0	0	100	2	100	3	0	0	100	2	0	0	0	0	100	1	0	0
46	100	1	0	0	75	3	100	3	0	0	100	3	0	0	0	0	100	3	0	0
47	100	3	0	0	----	----	100	7	0	0	100	6	0	0	0	0	75	3	0	0
48	100	1	0	0	0	0	50	4	0	0	100	4	0	0	0	0	25	5	0	0
49	75	2	0	0	25	1	0	0	0	0	75	1	0	0	0	0	75	2	0	0
50	*93*	*2*	*0*	*0*	*80*	*5*	*93*	*4*	*25*	*10*	*85*	*4*	*50*	*7*	*0*	*0*	*77*	*5*	*83*	*6*
51	100	2	0	0	100	3	0	0	0	0	75	3	25	4	0	0	0	0	100	3
52	100	2	0	0	100	7	100	8	0	0	100	7	0	0	0	0	100	5	50	12
53	0	0	0	0	0	0	0	0	0	0	75	2	25	3	0	0	25	3	0	0
54	100	2	0	0	100	5	100	5	25	12	100	9	25	12	0	0	100	5	100	2
55	0	0	0	0	100	4	100	3	0	0	100	3	0	0	0	0	100	1	0	0
56	----	----	----	----	----	----	----	----	----	----	100	3	----	----	----	----	100	5	----	----
57	100	1	----	----	25	6	100	2	----	----	100	3	----	----	----	----	100	5	100	5
58	100	1	0	0	25	8	100	6	0	0	50	8	50	8	0	0	100	6	100	7
59	100	1	0	0	100	7	100	3	0	0	75	4	0	0	0	0	100	6	0	0
60	100	2	0	0	100	3	100	2	0	0	100	5	0	0	0	0	100	4	0	0
61	50	2	0	0	25	3	25	3	0	0	100	3	0	0	0	0	25	3	0	0
62	0	0	0	0	100	6	100	2	25	7	0	0	0	0	0	0	25	6	50	5
63	100	2	0	0	100	6	100	9	0	0	100	5	75	11	0	0	100	8	0	0
64	75	3	0	0	0	0	0	0	0	0	25	3	100	2	0	0	25	4	0	0
65	*98*	*2*	*100*	*11*	*86*	*5*	*90*	*5*	*88*	*14*	*100*	*5*	*95*	*5*	*0*	*0*	*79*	*4*	*83*	*9*
66	100	1	0	0	100	8	100	5	100	14	100	5	100	4	0	0	100	5	0	0
67	75	8	100	11	100	6	100	7	75	14	100	5	100	7	0	0	100	4	100	12
68	100	1	0	0	100	9	100	5	0	0	100	11	100	4	0	0	100	2	0	0
69	100	2	0	0	0	0	100	4	0	0	0	0	0	0	0	0	0	0	0	0
70	100	1	----	----	25	5	75	3	----	----	100	3	----	----	----	----	----	----	----	----
71	100	1	0	0	----	----	100	3	0	0	100	4	0	0	0	0	----	----	50	6
72	100	1	0	0	100	3	100	5	0	0	100	4	100	5	0	0	100	2	0	0
73	100	1	0	0	100	5	50	8	0	0	100	4	0	0	0	0	100	5	0	0
74	100	1	0	0	75	2	75	3	0	0	100	2	0	0	0	0	25	2	0	0
75	100	2	0	0	0	0	100	3	0	0	100	4	75	5	0	0	25	5	100	8

35	One case scorbutus, in a female, from exposure to cold and overwork.		
36	Pharyngitis	100	1
38	Peritonitis	25	4
45	Hysteria	33	6
	Bright's disease	67	6
47	Pharyngitis	100	3
	The prevailing diseases during the month have been those of the respiratory passages; ozone has ranged high, Feb. 28.		
48	Cerebral apoplexy	25	4
	Our influenza is almost a catarrhal fever, in many cases, Feb. 15. Water low in wells and river; influenza on increase, quite severe among children, Feb. 22.		
52	Past two weeks very trying for aged people, mostly from bronchial affections, Feb. 15.		
56	Sypbilis	100	5
57	Laryngitis	100	2
60	Hepatitis	50	6
	Pleurisy	25	5
62	Catarrhal fever	100	1
63	Pharyngitis	100	5
	Not very sickly, Feb. 8. Continues healthy, 3 weeks ending March 1.		
64	See note 64 for Feb., page 434.		
66	Parotiditis	100	11
68	Varicella	75	15
	Diseases of the throat rather common; in some parts of the city quite a number of cases of scarlatina, not epidemic, Feb. 22. Throat difficulties still take the lead, but not so common; scarlatina is probably increasing a little; it is not severe, March 1. Genuineness of croup and diphtheria questioned.		
70	Mitigation of everything, Feb. 22. Mild, all except influenza, March 1. Diphtheria marked "mongrel."		
73	Cerebral meningitis	50	8
	Dyspepsia	100	4
	Pharyngitis	100	3
	Paralysis	75	8
	Pleuritis	25	8
	Conjunctivitis	25	7
	About Feb. 18, an epidemic of influenza and bronchitis broke out, and lasted for about three weeks. I could not discover any cause, such as an increase or decrease of ozone, rapid change of temperature, etc. Epizootic among horses was prevalent to a moderate extent only.		
74	Catarrhal jaundice	25	2
	See note 74 for Feb., page 434.		

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§ The disease of which there were the most cases was to be marked 1 in order, on the cards; that of which there was the next greatest number of cases, 2; and so on. Diseases not present were to be marked 0. This column states the average order of prevalence only for those weeks the disease was reported present.

¶ The several numbered lines on pages 392-3, continue statements for the localities and divisions which are named and have the same line-numbers on pages 390-1. On the right side of the page the numbers before the side-notes are the line-numbers of the localities on pages 390-1, to which the side-notes refer.

March 1, 1879, Dr. S. S. French, health officer of Battle Creek, wrote: "We have had but very little sickness, malarial taking the lead; a few cases of scarlet fever, two deaths from it in the last few months, some 8 cases in all; no well-marked cases of diphtheria, though the doctors of the Sanitarium tell of some 80 cases. We are investigating it and I will report when completed."

"This month is noticeable for its snow-fall and its degree of cold as compared with January or December previous. There has been no epidemic sickness of any sort, the general health being very good, indeed. Two cases of diphtheria in children, from 6 to 13 years, are known to me, both of which recovered easily and quickly. A very few seem to have slight touches of pneumonia."—*Rev. A. W. Bill, of Menominee, on Feb. Meteorological Register.*

NOTE.—For comments on Table 3 see page 367; for plan of marking the card-reports, see pages 367-8. Summaries from Table 3 are given in Tables 1 and 2 pages 372-383; also on pages 386, 388, and in Table 4 and Exhibits 24 and 25, on following pages.

TABLE 3—CONTINUED.—*Diseases, by Localities in Michigan, Four Weeks ending* **March** *29, 1879.*

LINE NUMBER.	DIVISIONS AND LOCALITIES REPRESENTED, AND INITIALS OF PHYSICIANS WHO REPORTED.* (Health Officers in italics; those also Correspondents marked with a *.)	Reports Received.	Bronchitis.		Cerebro-Spinal Men'gitis.		Cholera Infantum.		Cholera Morbus.		Consumption, Pulmonary.		Croup, Membraneous.		Diphtheria.		Diarrhea.		Dysentery.		Erysipelas.		Fever, Intermittent.		Fever, Remittent.		Fever, Typhoid (Enteric.)		Fever, Typho-Malarial.	
			Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present ‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present §	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§
1	ALL LOCALITIES.......... ‖	248	95	2.5	70	10.2	45	6.4	38	9.5	91	6.0	39	7.1	60	6.4	70	7.1	39	8.4	64	6.4	88	3.5	77	4.6	54	6.7	65	8.0
2	UPPER PENIN. DIV......†	12	83	3	0	0	25	4	0	0	100	4	25	5	100	2	50	4	25	3	42	6	0	0	25	5	25	4	0	0
3	Houghton—H. W. J......	4	100	2	0	0	0	0	0	0	100	2	----	----	0	0	75	2	0	0	50	7	0	0	0	0	0	0	0	0
4	Ishpeming—*W. T. C.*..*	4	75	2	0	0	0	0	0	0	100	5	25	7	0	0	25	5	0	0	25	5	0	0	25	6	0	0	0	0
5	Negaunee—*A. C. M.*	4	75	4	0	0	25	4	0	0	100	5	25	3	100	2	50	6	25	3	50	6	0	0	25	4	25	4	0	0
6	NORTH-WESTERN DIV..†	8	75	3	0	0	0	0	0	0	25	8	0	0	50	8	75	6	0	0	25	5	100	4	0	0	0	0	0	0
7	Cadillac—*J. M. W.*.......	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	Manistee—J. K...........	4	75	3	0	0	0	0	0	0	25	8	0	0	50	8	75	6	0	0	25	5	100	4	0	0	0	0	0	0
9	NORTH-EASTERN DIV. .†	4	100	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	6	0	0	0	0	0	0
10	Alpena—W. P. M.	4	100	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	6	0	0	0	0	0	0
11	WESTERN DIVISION.....†	20	100	3	0	0	25	3	75	13	100	8	25	9	38	5	63	10	25	9	75	6	81	5	88	4	0	0	75	3
12	Grand Haven—*A. V.*....	4	100	2	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	75	5	----	----	50	3	----	----	----	----
13	Grand Rapids—A. H....	4	100	3	0	0	0	0	0	0	100	5	25	9	50	7	50	8	0	0	0	0	100	7	100	2	0	0	0	0
14	Holland—*B. L.*..........	4	0	0	0	0	25	3	0	0	0	0	0	0	25	3	0	0	25	3	100	2	25	3	100	2	0	0	75	3
15	Ludington—*A. P. Mc.*..	4	100	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	4	100	5	0	0	0	0	0	0
16	Muskegon—*O. C. W.* ...	4	100	5	0	0	0	0	75	13	100	10	0	0	0	0	75	11	25	14	100	12	100	6	100	8	0	0	0	0
17	NORTH'N CENTRAL DIV.†	4	75	2	0	0	0	0	0	0	0	0	0	0	25	3	0	0	0	0	50	3	75	1	0	0	0	0	0	0
18	Big Rapids—*I. W. B.*...	4	75	2	0	0	0	0	0	0	0	0	0	0	25	3	0	0	0	0	50	3	75	1	0	0	0	0	0	0
19	BAY AND EASTERN DIV.†	36	100	3	63	9	0	0	50	6	75	6	25	10	68	7	75	6	33	6	70	6	100	2	75	5	50	6	33	9
20	Bay City—W. H. B......	4	100	1	0	0	0	0	0	0	100	7	0	0	100	12	0	0	0	0	100	8	100	3	100	10	----	----	25	13
21	Bay City—W. R. M.....	4	100	3	0	0	0	0	0	0	100	5	0	0	75	6	0	0	0	0	0	0	100	2	50	6	0	0	0	0
22	Port Huron—*S. W. S.*...	4	100	3	100	10	0	0	0	0	100	9	0	0	100	8	0	0	0	0	100	8	100	3	100	4	0	0	0	0
23	Port Huron—A. A. W..	4	100	3	0	0	0	0	50	6	100	6	0	0	100	6	75	7	50	7	0	0	100	1	100	3	0	0	50	7
24	Port Sanilac—J. M. L..	4	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
25	Saginaw City—N. D. L..	4	100	3	0	0	0	0	0	0	25	5	0	0	25	5	50	5	25	6	50	5	100	1	0	0	50	5	0	0
26	Saginaw City—*I. N. S.*..	4	100	3	25	7	0	0	0	0	25	6	25	10	50	7	100	7	25	6	50	9	100	1	75	6	50	7	25	7
27	Thornville—J. S. C.....	4	100	3	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	0	0	100	2	0	0	0	0	0	0
28	W. Bay City—*J. W. H.*.	4	100	2	0	0	0	0	0	0	50	2	0	0	25	2	0	0	0	0	50	2	100	1	25	2	0	0	0	0
29	CENTRAL DIVISION......†	46	87	3	25	13	100	8	25	12	92	6	38	4	50	6	75	5	0	0	75	5	88	3	80	4	0	0	100	6
30	Charlotte—G. B. A......	4	100	3	25	13	100	8	25	12	100	13	0	0	100	11	100	6	0	0	0	0	100	4	100	8	0	0	0	0
31	DeWitt—G. W. T.......	4	100	1	0	0	0	0	0	0	100	5	0	0	25	4	0	0	0	0	0	0	100	3	50	4	0	0	0	0
32	Elsie—E. B. T...........	2	50	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	3	100	4	0	0	0	0
33	Flint—*J. B. F. C.*.......	4	100	4	0	0	0	0	0	0	100	4	0	0	50	7	75	5	0	0	100	5	100	6	50	7	0	0	100	6
34	Hastings—A. P. D......	4	0	0	0	0	0	0	0	0	100	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

35	Hubbardston—H. W. B.	4	75	11	0	0	0	0	0	0	100	9	0	0	0	0	0	0	0	0	75	9	100	4	75	3	0	0	0	0
36	Ionia—*S. V. R.*	4	0	0	0	0	0	0	0	0	25	5	0	0	0	0	0	0	0	0	0	0	100	1	100	2	0	0	0	0
37	North Lansing—O. M.	4	100	2	0	0	0	0	0	0	100	2	50	3	50	1	0	0	0	0	50	4	100	2	0	0	0	0	0	0
38	Otisville—A. W. N.	4	100	1	0	0	0	0	0	0	100	3	25	4	25	5	0	0	0	0	0	0	100	2	0	0	0	0	0	0
39	Ovid—O. B. C.	4	100	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	4	100	3	0	0	0	0
40	Vernon—D. C. H.	4	100	1	0	0	0	0	0	0	100	5	0	0	0	0	50	3	0	0	50	4	100	2	75	2	0	0	0	0
41	Webberville—R. B. S.	4	25	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	2	50	2	0	0	0	0	0	0
42	SOUTH-WESTERN DIV..†	*19*	*100*	*3*	*0*	*0*	*0*	*0*	*0*	*0*	*95*	*5*	*75*	*8*	*75*	*3*	*0*	*0*	*0*	*0*	*75*	*6*	*83*	*5*	*25*	*4*	*0*	*0*	*100*	*3*
43	Allegan—H. S. L.	4	100	1	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
44	Mattawan—T. H. B.	3	0	0	0	0	0	0	----	----	67	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
45	Niles—*O. P. H.*	4	100	4	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	100	3	100	2	0	0	0	0	100	3
46	Niles—J. S. R.	4	100	3	0	0	0	0	0	0	100	6	75	8	0	0	0	0	0	0	50	9	50	10	25	9	0	0	0	0
47	Otsego—M. C.	4	100	2	0	0	0	0	0	0	100	5	0	0	75	3	0	0	0	0	0	0	100	4	0	0	0	0	0	0
48	SOUTH'N-CENTRAL DIV.†	*59*	*98*	*2*	*100*	*10*	*25*	*4*	*25*	*12*	*100*	*7*	*31*	*6*	*50*	*7*	*65*	*7*	*0*	*0*	*50*	*6*	*90*	*4*	*81*	*5*	*25*	*4*	*42*	*9*
49	Adrian—R. S.	4	100	1	0	0	0	0	0	0	100	3	0	0	25	4	0	0	0	0	50	5	75	2	0	0	25	5	0	0
50	Albion—J. P. S.	4	100	3	0	0	0	0	25	12	100	7	0	0	0	0	50	11	0	0	100	8	100	4	100	6	0	0	0	0
51	Brooklyn—E. N. P.	3	100	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	2	0	0	0	0	0	0
52	Clinton—A. W. A.	4	75	5	100	10	0	0	0	0	100	11	0	0	0	0	0	0	0	0	75	8	25	12	50	6	0	0	50	12
53	Coldwater—*L. H. W.** and S. S. C.	4	100	2	0	0	0	0	0	0	100	7	25	3	50	4	25	10	0	0	0	0	100	5	100	6	0	0	0	0
54	Hillsdale—*A. C.*	4	100	6	0	0	25	4	0	0	100	7	50	6	0	0	0	0	0	0	25	3	100	2	50	1	25	2	50	5
55	Jackson (Prison)—E. L. K.	4	100	1	----	----	----	----	----	----	100	4	----	----	----	----	----	----	----	----	----	----	75	3	25	2	----	----	----	----
56	Jackson—W. W.	4	100	1	0	0	0	0	0	0	100	5	0	0	75	7	0	0	0	0	0	0	0	0	100	5	0	0	0	0
57	Kalamazoo—W. B. S.	4	100	2	0	0	0	0	0	0	100	9	0	0	0	0	0	0	0	0	0	0	100	4	100	5	0	0	25	9
58	Marshall—*H. L. J.* *	4	100	2	0	0	0	0	0	0	0	0	25	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
59	Mendon—H. C. C.	4	100	1	0	0	0	0	0	0	100	7	25	8	0	0	0	0	0	0	0	0	100	4	100	5	0	0	0	0
60	Mendon—E. S.	4	100	1	0	0	0	0	0	0	0	0	0	0	0	0	50	3	0	0	0	0	100	2	0	0	0	0	0	0
61	Sturgis—N. I. P.	4	100	2	0	0	0	0	0	0	0	0	0	0	0	0	100	3	0	0	25	5	100	2	0	0	0	0	0	0
62	Three Rivers—C. W. B.	4	100	1	0	0	0	0	0	0	100	10	0	0	50	11	100	8	0	0	25	9	100	3	100	8	0	0	0	0
63	Ypsilanti—*E. B.* *	4	----	----	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	1	0	0	0	0	0	0
64	SOUTH-EASTERN DIV...†	*40*	*100*	*2*	*100*	*11*	*50*	*13*	*25*	*7*	*94*	*6*	*58*	*10*	*75*	*9*	*85*	*10*	*58*	*12*	*75*	*10*	*88*	*4*	*100*	*5*	*100*	*12*	*92*	*10*
65	Detroit—L. C.	4	100	2	0	0	0	0	0	0	100	7	0	0	50	16	100	12	50	17	100	12	100	5	100	10	0	0	100	15
66	Detroit—*E. L.*	4	100	4	100	11	50	13	0	0	100	5	100	11	100	11	75	12	100	12	100	14	100	2	100	1	100	10	100	9
67	Detroit—W. H. R.	4	100	3	0	0	0	0	0	0	100	7	50	15	100	11	100	12	0	0	100	13	100	6	100	4	100	14	0	0
68	Milford—R. J.	4	100	2	0	0	0	0	0	0	100	5	25	5	25	6	0	0	0	0	0	0	100	1	0	0	0	0	0	0
69	Northville—J. M. S.	4	----	----	0	0	0	0	0	0	0	0	0	0	100	2	0	0	0	0	25	3	50	3	0	0	0	0	0	0
70	Pontiac—W. G. E.	4	100	2	0	0	0	0	0	0	100	8	0	0	0	0	100	8	25	8	0	0	100	6	0	0	0	0	0	0
71	Utica—G. G. R.	4	100	4	0	0	0	0	25	8	100	7	0	0	0	0	0	0	0	0	0	0	25	6	0	0	0	0	0	0
72	Washington—A. Y.	4	100	1	0	0	0	0	25	6	100	5	0	0	0	0	50	7	0	0	50	7	100	5	0	0	0	0	75	7
73	Wyandotte—E. P. C.	4	100	2	0	0	0	0	0	0	50	4	0	0	0	0	0	0	0	0	0	0	100	2	0	0	0	0	0	0
74	Wyandotte—*T. J. L.*	4	100	1	0	0	0	0	0	0	100	9	0	0	0	0	0	0	0	0	0	0	100	5	0	0	0	0	0	0

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*, †, ‡, §, ‖, For explanations and references, see pages 390-1.

April 28, 1879, Lee S. Cobb, of Nirvana, wrote: "During the very last of March and the first of this month coughs and colds have been *very* prevalent; and even at this date there are more than the average number of cases."

One death from diphtheria, boy 4 years old. Health in general extremely good. Several deaths from scarlet fever at Marinette, Wis., on opposite bank of river, about two miles distant.—*Rev. A. W. Bill, Menominee*, on March meteorological register.

ADDITIONAL NOTES FOR JANUARY.—28. Of diphtheria there has been but one fatal case in the city. It is now on the decline, probably from the cold weather. We all use well-water, which is considered as good as any in the State. Whooping-cough on the decline in severity, Jan. 6.—*I. W. Badger, M. D., of Big Rapids.*

31. No change to note; whooping-cough, epidemic, but quite light, Jan. 4. So little sickness it seems hardly an opportunity to change the record from week to week, Jan. 11. No change; no epidemic, Jan. 18. Almost as last week; no change, Jan. 25. Not change enough to make an interest in keeping a record; all very healthy, Feb. 1.—*W. R. Marsh, M. D., of Bay City.*

TABLE 3.—*Diseases, by Localities in Michigan, Four Weeks ending* **March** *29, 1879.*—CONTINUED.

LINE NUMBER. ¶	Influenza. Per cent of Weeks Present.‡	Influenza. Av. Order of Prevalence when Present.§	Measles. Per cent of Weeks Present.‡	Measles. Au. Order of Prevalence when Present.§	Neuralgia. Per cent of Weeks Present.‡	Neuralgia. Av. Order of Prevalence when Present.§	Pneumonia. Per cent of Weeks Present.‡	Pneumonia. Av. Order of Prevalence when Present.§	Puerperal Fever. Per cent of Weeks Present.‡	Puerperal Fever. Av. Order of Prevalence when Present.§	Rheumatism. Per cent of Weeks Present.‡	Rheumatism. Av. Order of Prevalence when Present.§	Scarlatina. Per cent of Weeks Present.‡	Scarlatina. Av. Order of Prevalence when Present.§	Small-pox. Per cent of Weeks Present.‡	Small-pox. Av. Order of Prevalence when Present.§	Tonsilitis. Per cent of Weeks Present.‡	Tonsilitis. Av. Order of Prevalence when Present.§	Whooping-Cough. Per cent of Weeks Present.‡	Whooping-Cough. Av. Order of Prevalence when Present.§
1	92	1.9	56	5.0	83	4.5	82	4.4	50	9.9	90	4.4	65	5.6	0	0	74	4.5	74	5.2
2	*83*	*2*	*25*	*6*	*100*	*4*	*67*	*4*	*0*	*0*	*83*	*5*	*83*	*4*	*0*	*0*	*100*	*3*	*100*	*1*
3	100	1	0	0	100	4	100	4	0	0	100	5	100	3	0	0	100	3	0	0
4	75	1	25	6	100	3	25	5	0	0	100	4	75	6	0	0	100	2	0	0
5	75	3	25	5	----	----	75	4	0	0	50	5	75	3	0	0	----	----	100	1
6	*100*	*2*	*0*	*0*	*50*	*8*	*100*	*3*	*50*	*10*	*63*	*5*	*0*	*0*	*0*	*0*	*50*	*5*	*100*	*2*
7	0	0	0	0	0	0	100	1	0	0	25	2	0	0	0	0	0	0	0	0
8	100	2	0	0	50	8	100	4	50	10	100	8	0	0	0	0	50	5	100	2
9	*100*	*1*	*0*	*0*	*75*	*5*	*75*	*5*	----	----	*100*	*4*	*100*	*4*	*0*	*0*	*100*	*3*	*25*	*7*
10	100	1	0	0	75	5	75	5	----	----	100	4	100	4	0	0	100	3	25	7
11	*100*	*1*	*100*	*5*	*85*	*5*	*100*	*4*	*0*	*0*	*90*	*5*	*69*	*6*	*0*	*0*	*75*	*6*	*75*	*6*
12	100	2	----	----	50	7	100	4	----	----	75	4	50	7	----	----	50	8	50	6
13	100	1	0	0	100	7	0	0	0	0	75	6	100	7	0	0	50	7	100	5
14	160	1	0	0	75	3	100	2	0	0	100	3	0	0	0	0	0	0	0	0
15	0	0	100	5	100	6	100	4	0	0	100	4	25	8	0	0	100	3	0	0
16	100	1	0	0	100	2	100	7	0	0	100	9	100	3	0	0	100	4	0	0
17	*25*	*3*	*0*	*0*	*0*	*0*	*25*	*2*	*0*	*0*	*75*	*2*	*25*	*4*	*0*	*0*	*0*	*0*	*0*	*0*
18	25	3	0	0	0	0	25	2	0	0	75	2	25	4	0	0	0	0	0	0
19	*89*	*3*	*67*	*3*	*84*	*5*	*83*	*5*	*25*	*7*	*92*	*4*	*50*	*7*	*0*	*0*	*78*	*5*	*71*	*5*
20	100	2	0	0	100	8	100	7	0	0	100	4	100	10	0	0	50	10	100	5
21	100	1	0	0	----	----	100	4	0	0	100	6	100	6	0	0	----	----	100	7
22	100	1	0	0	100	5	100	8	25	7	75	6	25	9	0	0	100	5	25	7
23	25	7	75	6	100	7	100	5	0	0	75	4	50	7	0	0	75	6	50	7
24	100	1	100	2	25	5	75	4	----	----	75	4	----	----	----	----	75	5	----	----
25	0	0	0	0	100	3	100	3	0	0	100	4	25	6	0	0	100	3	0	0
26	100	6	0	0	100	3	100	5	0	0	100	3	25	6	0	0	100	4	0	0
27	100	1	0	0	100	5	50	5	0	0	100	5	0	0	0	0	50	5	50	3
28	0	0	25	2	50	1	25	2	0	0	100	1	25	2	0	0	75	2	100	2
29	*86*	*2*	*25*	*4*	*81*	*3*	*79*	*4*	*38*	*5*	*84*	*4*	*38*	*4*	*0*	*0*	*69*	*4*	*63*	*3*
30	100	2	0	0	100	8	100	8	----	----	100	3	----	----	----	----	100	7	0	0
31	0	0	0	0	100	3	75	2	0	0	100	3	0	0	0	0	100	4	0	0
32	100	1	0	0	0	0	100	2	0	0	0	0	0	0	0	0	0	0	0	0
33	100	1	25	4	100	2	100	3	25	8	100	4	50	7	0	0	100	4	0	0
34	100	1	0	0	100	2	100	4	0	0	0	0	0	0	0	0	0	0	100	4
35	100	1	0	0	100	5	100	7	----	----	100	6	0	0	0	0	100	8	25	1
36	100	3	0	0	----	----	25	4	0	0	100	5	25	4	0	0	----	----	0	0
37	75	2	0	0	50	2	100	2	0	0	0	0	0	0	0	0	50	3	0	0

LINE NUMBER. ¶	DISEASES REPORTED WHICH WERE NOT PRINTED ON THE BLANKS, AMOUNT OF SICKNESS, ETC. ¶	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§
3	Spasmodic croup	25	4
	Ulcerative sore throat	100	2
	Diarrhea marked catarrhal.		
5	Some of the cases of diphtheria and scarlet fever have been very malignant, March 22. Whooping cough very severe, March 29.		
12	Hepatic colic	25	6
13	Mumps	100	6
14	Bilious fever	25	3
18	Spasmodic croup	25	1
20	Tubercular meningitis	25	12
	Two fatal cases of "true diphtheria" (rare here) occurred last week. The house is located in the midst of decaying sawdust and refuse from mill, stands close to the ground, and is poorly ventilated, besides being crowded with inmates. There is nearly always more or less sickness in the neighborhood.		
21	Whooping-cough nearly gone, March 8. Not much change, 3 weeks ending March 29. No epidemic except this influenza, March 22.		
23	Still mild, more cases, Mar. 8. Mild, Mar. 15. Usual severity, 2 weeks ending Mar. 29.		
24	Mumps	50	2
25	Some of these cases marked diphtheria were in families where they have had diphtheria, but were seen early; perhaps were diphtheria, had constitutional symptoms of it, Mar. 15.		
31	Synovitis and cerebral congestion, each	25	5
	Bright's disease and paralysis, each	100	5
33	Spasmodic croup	50	9
	Pyæmia	25	8
34	Mumps	75	4
	But little sickness, Mar. 29.		
35	Pharyngitis	100	2
37	Meningitis	25	4
	Enteritis	50	4
	Unusually healthy for the time of year; no epidemic of any kind; epidemic catarrh rapidly subsiding, Mar. 15. Generally healthy, no epidemic of any kind, Mar. 22. During the early part of winter epidemic catarrh or influenza was widely prevalent,		

38	75	2	25	4	0	0	25	5	0	0	0	0	0	0	0	0	75	4	0	0
39	75	2	0	0	25	4	50	3	0	0	25	4	50	5	0	0	0	0	0	0
40	75	2	0	0	100	3	100	4	0	0	100	4	0	0	0	0	25	4	0	0
41	50	1	0	0	50	2	0	0	50	1	50	2	25	1	0	0	50	1	0	0
42	*100*	*1*	*0*	*0*	*80*	*4*	*84*	*4*	*0*	*0*	*100*	*4*	*0*	*0*	*0*	*0*	*53*	*4*	*0*	*0*
43	100	2	0	0	100	3	100	5	0	0	100	5	0	0	0	0	25	7	0	0
44	100	1	0	0	100	3	100	2	0	0	100	3	0	0	----	----	100	2	0	0
45	100	2	0	0	100	3	100	2	0	0	100	3	0	0	0	0	25	3	----	----
46	100	1	0	0	----	----	100	5	0	0	100	7	0	0	0	0	100	3	0	0
47	100	1	0	0	25	5	25	4	0	0	100	3	0	0	0	0	25	5	0	0
48	*92*	*2*	*0*	*0*	*92*	*5*	*77*	*5*	*25*	*8*	*98*	*5*	*71*	*6*	*0*	*0*	*76*	*4*	*75*	*6*
49	0	0	0	0	50	3	25	4	0	0	100	3	75	4	0	0	0	0	0	0
50	100	1	0	0	200	8	100	6	0	0	100	6	0	0	0	0	100	4	50	9
51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	67	3	0	0
52	100	4	0	0	100	6	100	5	0	0	100	7	100	3	0	0	75	7	100	1
53	0	0	0	0	100	4	100	3	25	8	100	4	0	0	0	0	100	2	0	0
54	50	2	0	0	100	3	50	5	0	0	100	6	0	0	0	0	75	5	0	0
55	----	----	----	----	----	----	----	----	----	----	100	3	----	----	----	----	100	5	----	----
56	100	1	0	0	100	5	100	2	----	----	100	4	100	7	0	0	75	3	100	6
57	100	1	0	0	100	8	100	6	0	0	100	7	0	0	0	0	100	3	50	8
58	100	1	0	0	100	6	100	4	0	0	75	4	0	0	0	0	100	4	0	0
59	100	3	0	0	100	3	100	2	0	0	100	6	25	9	0	0	100	6	0	0
60	0	0	0	0	75	3	25	4	0	0	100	3	0	0	0	0	50	4	0	0
61	0	0	0	0	75	4	25	4	0	0	0	0	50	5	0	0	0	0	0	0
62	100	3	0	0	100	5	100	9	0	0	100	4	50	10	0	0	25	9	0	0
63	75	2	0	0	0	0	0	0	0	0	0	0	100	3	0	0	25	3	0	0
64	*100*	*2*	*100*	*11*	*75*	*5*	*89*	*5*	*75*	*15*	*86*	*5*	*82*	*6*	*0*	*0*	*78*	*5*	*88*	*9*
65	100	2	100	11	100	5	100	10	75	15	100	5	100	9	0	0	100	5	100	11
66	100	4	0	0	100	7	100	4	100	15	100	5	100	6	0	0	100	9	0	0
67	100	2	0	0	100	10	100	8	50	15	100	9	100	5	0	0	100	1	0	0
68	100	3	0	0	25	5	100	4	0	0	0	0	0	0	0	0	0	0	0	0
69	100	1	0	0	25	2	0	0	0	0	25	3	0	0	0	0	25	2	0	0
70	100	1	0	0	50	5	100	4	0	0	100	4	50	8	0	0	50	7	0	0
71	100	1	0	0	100	4	100	4	0	0	100	5	100	4	0	0	100	2	0	0
72	100	3	0	0	100	4	50	6	0	0	100	3	50	6	0	0	75	6	0	0
73	100	2	0	0	75	3	50	3	0	0	50	4	0	0	0	0	50	3	0	0
74	100	2	0	0	0	0	100	6	0	0	100	3	75	5	0	0	100	6	75	7

40	and of unusual severity, and with aged or those with broken-down constitutions it occasionally proved fatal, more the resultant of bronchial inflammation accompanying or ingrafted upon the vital prostration of the epidemic catarrh than anything else. At present there is no epidemic of any kind, Mar. 28.		
44	Globus hystericus	33	5
46	Pharyngitis	100	4
	During the month the prevailing sickness has been a general attack upon the respiratory tract, ushered in by a chill and followed by fever (sthenic), headache, general malaise, muscular soreness, soon to be followed by a development of inflammation of the lining membrane of the respiratory passages, catarrh, coryza, stomatitis, glossitis, tonsilitis, pharyngitis, laryngitis, tracheitis, bronchitis, and during the latter part of the month, pneumonia. In many cases the complications were very grave. I have not met a case of diphtheria. I consider it to be an influenza of an epidemic character, March 31.		
47	Mumps	50	5
	Two fatal cases of diphtheria, week ending Mar. 22.		
49	Paralysis	25	5
53	Acute catarrh	75	1
	Pharyngitis	25	2
	The seven cases of diphtheria reported have all sprung up nearly together, no other well marked cases having occurred here during the last year to my knowledge. Six of the cases were in Irish families, and in the same locality. The other was in a Yankee family living over a billiard saloon. Bad ventilation, I am satisfied, existed in all. No other cause has been ascertained. No new cases have occurred during the last few days.—S. S. C., Mar. 29.		
55	Syphilis	100	6
56	Laryngitis	100	2
	Remittent fever marked mostly mild infantile.		
59	Hepatitis	100	7
60	Biliary calculi	25	5
61	Catarrhal fever	50	2
62	Catarrh	25	5
	Pharyngitis	100	6
	Continues healthy, 4 weeks ending Mar. 29.		
63	Ulcerated sore throat	25	4
66	Mumps	100	12
67	Not much sickness, two weeks ending March 15.		
	Some increase of influenza and tonsilitis, March 22.		
	Rather healthy, March 29.		
69	Very healthy, March 8. No acute disease requiring attention, March 15. Increase of diphtheria, and somewhat severe, March 22.		
72	Dyspepsia	100	3
	Pharyngitis	100	5
	Cystitis	25	7
73	Mumps	25	2

‡, §. For explanations see pages 390-1.

¶ The several numbered lines on these two pages continue statements for the localities and divisions which are named and have the same line-numbers on pages 394-5; on the right side of the page the numbers before the side-notes are the line-numbers of the localities, on pages 394-5, to which the side-notes refer.

ADDITIONAL NOTES FOR JAN.—Line 78, p. 389. But little sickness, Jan. 4. Not much sickness except throat troubles, and in some parts of the city scarlatina, Jan. 11. Quite a number of cases of sore throat, diphtheria, so called; otherwise very little sickness, Jan. 18. Follicular tonsilitis quite prevalent, and some cases quite severe; throat troubles take the lead, Jan. 26. Quite a number of cases of tonsilitis and other throat and lung difficulties; otherwise little sickness, Feb. 1.—*W. H. Rouse, M. D., of Detroit.*

TABLE 3.—CONTINUED.—*Diseases by Localities in Michigan, Five Weeks ending* **May** *3, 1879.*

LINE NUMBER.	DIVISIONS AND LOCALITIES REPRESENTED, AND INITIALS OF PHYSICIANS WHO REPORTED.* (Health Officers in italics; those also Correspondents marked with a *.)	Reports Received.	Bronchitis.		Cerebro-Spinal Men'gitis.		Cholera Infantum.		Cholera Morbus.		Consumption, Pulmonary.		Croup, Membraneous.		Diphtheria.		Diarrhea.		Dysentery.		Erysipelas.		Fever, Intermittent.		Fever, Remittent.		Fever, Typhoid (Enteric).		Fever, Typho Malarial.	
			Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§
1	ALL LOCALITIES‖	290	87	2.8	41	6.7	40	8.3	41	6.7	94	5.5	46	6.2	63	6.1	61	6.6	73	9.8	60	6.5	88	2.6	82	4.1	63	8.4	50	7.1
2	UPPER PENIN. DIV.†	*10*	*70*	*3*	*0*	*0*	*0*	*0*	*0*	*0*	*100*	*3*	*0*	*0*	*0*	*0*	*40*	*3*	*0*	*0*	*20*	*6*	*80*	*3*	*0*	*0*	*0*	*0*	*0*	*0*
3	Houghton—H. W. J.	5	40	4	0	0	0	0	0	0	100	1	0	0	0	0	40	3	0	0	20	4	80	3	0	0	0	0	0	0
4	Ishpeming—W. T. C.*	5	100	2	0	0	0	0	0	0	100	4	0	0	0	0	0	0	0	0	20	7	0	0	0	0	0	0	0	0
5	NORTH-WESTERN DIV.†	*5*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
6	Cadillac—*J. M. W.*	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	WESTERN DIV.†	*24*	*83*	*3*	*0*	*0*	*0*	*0*	*100*	*11*	*100*	*9*	*0*	*0*	*30*	*11*	*50*	*7*	*100*	*13*	*70*	*7*	*75*	*4*	*100*	*4*	*0*	*0*	*60*	*7*
8	Grand Haven—A. V.*	5	100	2	----	----	----	----	----	----	----	----	----	----	----	----	40	5	----	----	40	7	60	2	100	2	----	----	60	7
9	Grand Rapids—A. H.	5	80	5	0	0	0	0	0	0	100	6	0	0	40	8	20	7	0	0	60	7	100	6	100	3	0	0	0	0
10	Holland—*B. L.*	5	40	3	0	0	0	0	0	0	0	0	----	----	0	0	40	3	---	----	80	3	20	3	100	1	0	0	0	0
11	Ludington—*A. P. McC.*	4	100	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	3	0	0	0	0	0	0
12	Muskegon—*O. C. W.*	5	100	3	0	0	0	0	100	11	100	11	0	0	20	13	100	11	100	13	100	12	100	6	100	8	0	0	0	0
13	NORTH'N-CENT'L DIV.†	*5*	*40*	*2*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*40*	*4*	*20*	*2*	*0*	*0*	*40*	*3*	*80*	*1*	*0*	*0*	*0*	*0*	*0*	*0*
14	Big Rapids—*I. W. B.*	5	40	2	0	0	0	0	0	0	0	0	0	0	40	4	20	2	0	0	40	3	80	1	0	0	0	0	0	0
15	BAY AND EAST'N DIV.†	*48*	*96*	*3*	*20*	*9*	*20*	*8*	*60*	*6*	*89*	*6*	*40*	*8*	*63*	*8*	*52*	*7*	*0*	*0*	*80*	*7*	*100*	*2*	*100*	*5*	*40*	*8*	*27*	*9*
16	Bay City—W. H. B.	5	100	2	0	0	0	0	0	0	100	8	0	0	60	12	80	10	0	0	100	11	100	3	100	8	0	0	20	13
17	Bay City—W. R. M.	5	100	4	0	0	0	0	0	0	100	5	40	6	0	0	0	0	0	0	----	----	100	1	100	4	0	0	20	6
18	Lapeer—A. N.	5	100	5	0	0	0	0	0	0	80	7	0	0	40	7	0	0	0	0	0	0	100	4	0	0	0	0	0	0
19	Port Huron—*S. W. S.*	5	100	4	20	9	0	0	0	0	100	10	0	0	100	9	0	0	0	0	100	8	100	1	100	5	0	0	0	0
20	Port Huron—A. A. W.	5	100	3	0	0	20	6	60	6	100	7	0	0	60	6	40	7	0	0	0	0	100	1	100	2	0	0	0	0
21	Port Sanilac—J. M. L.	3	33	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	3	0	0	0	0	0	0
22	Saginaw City—N. D. L.	5	100	3	0	0	0	0	0	0	60	4	0	0	20	3	20	6	0	0	0	0	100	1	0	0	40	6	0	0
23	S. City—*I. N. S. & E. A. H.*	5	100	3	----	----	20	9	----	----	100	6	40	9	100	8	100	8	----	----	60	7	100	1	100	6	40	9	40	8
24	Thornville—J. S. C.	5	100	3	0	0	0	0	0	0	100	6	0	0	0	0	20	6	0	0	0	0	100	2	0	0	0	0	0	0
25	W. Bay City—*J. W. H.*	5	100	1	0	0	0	0	0	0	60	2	0	0	0	0	0	0	0	0	60	3	100	1	100	2	0	0	0	0
26	CENTRAL DIVISION†	*50*	*78*	*4*	*0*	*0*	*80*	*10*	*30*	*7*	*98*	*5*	*25*	*5*	*48*	*5*	*50*	*4*	*0*	*0*	*25*	*5*	*84*	*2*	*86*	*3*	*40*	*7*	*40*	*3*
27	Charlotte—G. B. A.	5	100	3	0	0	80	10	20	11	100	13	20	10	100	10	100	5	0	0	0	0	100	3	100	7	20	12	0	0
28	DeWitt—G. W. T.	5	100	1	0	0	0	0	0	0	100	5	40	5	80	4	0	0	0	0	0	0	100	2	80	5	0	0	0	0
29	Hastings—A. P. D.	5	0	0	0	0	0	0	0	0	100	3	0	0	20	3	0	0	0	0	0	0	60	1	0	0	0	0	0	0
30	Hubbardston—H. W. B.	5	20	11	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	20	9	40	3	40	3	0	0	0	0
31	Ionia—S. V. R.	5	0	0	0	0	0	0	0	0	80	4	0	0	0	0	0	0	0	0	0	0	100	1	100	2	0	0	0	0
32	North Lansing—O. M.	5	100	2	0	0	0	0	0	0	100	2	20	3	20	3	0	0	0	0	20	3	80	1	0	0	0	0	0	0
33	Otisville—A. W. N.	5	100	2	0	0	0	0	0	6	100	2	0	0	20	3	40	3	0	0	20	3	100	1	0	0	0	0	0	0
34	Ovid—O. B. C.	5	100	2	0	0	0	0	40	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	3	0	0	0	0
35	Vernon—D. C. H.	5	80	4	0	0	0	0	0	0	100	5	0	0	0	0	20	5	0	0	0	0	100	1	100	2	60	2	40	3

36	Webberville—R. B. S	5	20	3	0	0	0	0	0	0	100	3	20	2	0	0	40	3	0	0	40	3	80	2	80	2	0	0	0	0
37	SOUTH-WESTERN DIV.†	*32*	*76*	*2*	*20*	*3*	*0*	*0*	*20*	*3*	*94*	*4*	*30*	*3*	*56*	*3*	*64*	*5*	*0*	*0*	*67*	*5*	*90*	*3*	*53*	*6*	*0*	*0*	*80*	*6*
38	Allegan—H. S. L.	5	100	1	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	0	0	100	5	40	7	0	0	0	0
39	Mattawan—T. H. B.	3	0	0	0	0	0	0	0	0	100	5	0	0	0	0	33	2	0	0	0	0	0	0	0	0	0	0	0	0
40	New Troy—G. H. R.	4	0	0	0	0	0	0	0	0	100	2	0	0	75	1	0	0	0	0	0	0	50	2	0	0	0	0	0	0
41	Niles—*O. P. H.*	5	100	4	0	0	0	0	0	0	100	3	40	3	0	0	0	0	0	0	100	3	100	1	0	0	0	0	80	4
42	Niles—J. S. R.	5	100	3	0	0	0	0	0	0	100	6	0	0	0	0	60	10	0	0	80	9	100	8	20	10	0	0	80	8
43	Otsego—M. C.	5	60	2	0	0	0	0	0	0	100	4	0	0	40	4	0	0	0	0	0	0	100	2	0	0	0	0	0	0
44	Paw Paw—J. A.	5	20	1	20	3	0	0	20	3	60	2	20	3	0	0	60	3	0	0	20	3	80	2	100	2	0	0	0	0
45	SOUTH'N CENTRAL DIV.†	*67*	*94*	*2*	*50*	*7*	*0*	*0*	*22*	*7*	*89*	*7*	*67*	*4*	*32*	*4*	*75*	*8*	*100*	*10*	*55*	*7*	*84*	*3*	*69*	*4*	*80*	*8*	*0*	*0*
46	Adrian—R. S. & *A. M. S.*	5	100	2	20	4	0	0	0	0	100	2	0	0	40	5	20	4	0	0	40	5	100	1	0	0	0	0	0	0
47	Albion—J P. S.	5	100	5	0	0	0	0	20	10	100	8	0	0	0	0	100	9	100	10	100	7	100	2	100	3	0	0	0	0
48	Clinton—A. W. A.	5	100	2	80	9	0	0	0	0	100	10	0	0	0	0	0	0	0	0	20	9	60	6	40	7	0	0	0	0
49	Coldwater—S. S. C.	5	100	1	0	0	0	0	0	0	100	9	100	6	0	0	80	9	0	0	60	9	100	6	100	6	0	0	0	0
50	Jackson (Prison), E. L. K	5	100	1	----	----	----	----	----	----	100	4	----	----	----	----	----	----	----	----	----	----	80	3	20	3	----	----	----	----
51	Jackson—*P. P.*	4	1 0	2	0	0	0	0	25	3	25	3	25	2	50	2	0	0	0	0	75	2	25	2	50	2	0	0	0	0
52	Jackson—W. W.	5	100	1	0	0	0	0	0	0	100	4	0	0	20	8	0	0	0	0	0	0	40	5	100	2	0	0	0	0
53	Kalamazoo—W. B. S.	5	80	4	0	0	0	0	0	0	100	8	0	0	0	0	0	0	0	0	0	0	100	3	100	5	0	0	0	0
54	Marshall—*H. L. J.**	5	100	3	0	0	0	0	0	0	40	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
55	Mendon—H. C. C.	5	100	1	0	0	0	0	0	0	100	7	0	0	0	0	0	0	0	0	0	0	100	3	100	4	80	8	0	0
56	Mendon—E. S.	5	100	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80	2	20	2	0	0	0	0
57	Sturgis—N. I. P.	2	0	0	0	0	0	0	0	0	0	0	0	0	33	4	0	0	0	0	0	0	100	1	33	2	0	0	0	0
58	Three Rivers—C. W. B.	5	100	1	0	0	0	0	0	0	100	10	0	0	0	0	100	8	0	0	40	9	100	3	80	8	0	0	0	0
59	Ypsilanti—*E. B.**	5	40	3	0	0	0	0	0	0	0	0	0	0	20	3	0	0	0	0	0	0	100	2	0	0	0	0	0	0
60	SOUTH-EASTERN DIV.†	*49*	*95*	*3*	*56*	*8*	*0*	*0*	*0*	*0*	*98*	*6*	*79*	*10*	*79*	*8*	*85*	*9*	*60*	*9*	*83*	*8*	*90*	*3*	*83*	*4*	*100*	*11*	*53*	*7*
61	Detroit—L. C.	5	100	2	0	0	0	0	0	0	100	5	0	0	0	0	100	15	100	15	100	13	100	3	100	12	0	0	40	13
62	Detroit—*E. L*	5	100	6	80	10	0	0	0	0	100	7	80	11	100	11	80	12	80	14	100	10	1 0	2	100	1	100	9	100	8
63	Detroit—W. H. R.	5	100	5	0	0	0	0	0	0	100	7	80	15	100	13	100	12	0	0	100	11	100	3	100	2	100	13	0	0
64	Milford—R. J.	5	100	3	0	0	0	0	0	0	80	4	0	0	0	0	0	0	0	0	0	0	100	1	0	0	0	0	0	0
65	Monroe—*P. S.*	4	75	1	25	5	----	----	----	----	100	4	75	5	100	4	100	5	0	0	75	4	100	5	100	5	0	0	0	0
66	Northville—J. M. S.	5	0	0	0	0	0	0	0	0	0	0	0	0	20	4	0	0	0	0	80	2	40	3	40	3	0	0	0	0
67	Pontiac—W. G. E.	5	100	2	0	0	0	0	0	0	100	10	0	0	0	0	100	9	0	0	40	10	100	3	0	0	0	0	0	0
68	Washington—A. Y.	5	100	2	0	0	0	0	0	0	100	4	0	0	0	0	60	5	20	4	0	0	60	5	0	0	0	0	0	0
69	Wyandotte—E. P. C.	5	80	2	0	0	0	0	0	0	100	3	0	0	0	0	60	3	40	3	----	----	100	1	0	0	0	0	20	1
70	Wyandotte—*T. J. L.*	5	100	2	0	0	0	0	0	0	100	7	0	0	0	0	0	0	0	0	0	0	100	2	60	2	0	0	0	0

*, †, ‡, §, ‖, For explanations and references, see pages 390–1.

"During the very last of March, 1879, and the first of April, coughs and colds have been very prevalent; and even at this date (April 28) there are more than the average number of cases."—*Lee S. Cobb, of Nirvana.*

Sickness chiefly among children and aged; children have light forms of diphtheria.—*Rev. A. W. Bill, of Menominee, on April meteorological register.*

ADDITIONAL NOTES FOR JAN.—Line 80, p. 389. Very healthy, Jan. 4. Distressingly healthy, Jan. 11. Soft weather, I think, has intensified some (influenza and rheumatism) and caused a general tendency. In very many, complaints of "most sick with cold," and "I have got the rheumatism," Jan. 18. Diphtheria marked "mongrel," 3 weeks ending Feb. 1. I am in much doubt about classification. "Mongrel Diphtheria" on the report card is peculiar. There is in some cases no sore throat, but the posterior nares is membranous, shooting in spray-like form down behind the soft palate, hoarseness, not much cough, sometimes dyspnœa, symptoms of croup, some tumefaction of the sides of the neck, and in one case in the region of the upper sternum, fever, chill, etc. Only a few severe cases. I find laryngitis and tracheitis; some sepsis, putrid breath. No difficulty of swallowing. In some cases a gradual increasing difficulty in breathing, amounting to croup almost.—*Feb. 3, 1879—J. M. Swift, M. D., of Northville.*

84. An influenza of severe form and general prevalence during past two weeks. Almost the whole population affected to some extent from slight catarrh of nasal passages to general implication of all the air-passages with severe constitutional symptoms, Jan. 28.—*E. P. Christian, M. D., of Wyandotte.*

TABLE 3.—*Diseases, by Localities, in Michigan, Five Weeks ending* **May** *3, 1879*—CONTINUED.

LINE NUMBER. ¶	Influenza.		Measles.		Neuralgia.		Pneumonia.		Puerperal Fever.		Rheumatism.		Scarlatina.		Small-pox.		Tonsilitis.		Whooping-Cough.	
	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§
1	84	2.4	58	4.4	82	4.5	76	4.5	47	7.8	84	4.0	66	5.1	0	0	67	4.6	68	6.1
2	*90*	*3*	*0*	*0*	*80*	*4*	*80*	*5*	*0*	*0*	*80*	*4*	*70*	*4*	*0*	*0*	*40*	*4*	*40*	*3*
3	100	3	0	0	80	4	80	5	0	0	60	4	60	3	0	0	20	5	0	0
4	80	2	0	0	80	3	0	0	0	0	100	3	80	5	0	0	60	3	40	3
5	*0*	*0*	*0*	*0*	*0*	*0*	*40*	*2*	*0*	*0*	*20*	*2*	*100*	*1*						
6	0	0	0	0	0	0	40	2	0	0	20	2	100	1						
7	*75*	*2*	*0*	*0*	*88*	*5*	*79*	*4*	*0*	*0*	*83*	*5*	*86*	*5*	*0*	*0*	*67*	*5*	*60*	*7*
8	60	4			40	7	100	3			60	6					40	6	20	7
9	100	1	0	0	100	7	0	0	0	0	80	6	60	7	0	0	80	6	100	6
10	40	2	0	0	100	1	40	3	0	0	80	2	0	0	0	0	20	3	0	0
11	0	0	0	0	100	5	75	3	0	0	100	5	100	4	0	0	100	4	0	0
12	100	1	0	0	100	3	100	7	0	0	100	8	100	3	0	0	100	5	0	0
13	*0*	*0*	*0*	*0*	*80*	*2*	*80*	*2*	*0*	*0*	*80*	*2*	*0*	*0*	*0*	*0*	*60*	*3*	*0*	*0*
14	0	0	0	0	80	2	80	2	0	0	80	2	0	0	0	0	60	3	0	0
15	*81*	*3*	*60*	*3*	*80*	*5*	*68*	*6*	*20*	*10*	*96*	*4*	*60*	*7*	*0*	*0*	*76*	*5*	*68*	*5*
16	100	1	40	4	100	6	100	7	0	0	100	4	60	12	0	0	0	0	100	8
17	100	3	60	3			100	6			100	6	20	7	0	0	20	8	100	7
18	100	1	20	3			100	3	0	0	100	4	0	0	0	0	0	0	0	0
19	100	7	80	2	100	7	20	10	0	0	100	7	80	4	0	0	100	5	0	0
20	20	5	80	4	20	7	0	0	0	0	80	6	100	4	0	0	60	7	40	6
21	100	1	0	0	0	0	0	0	0	0	100	2					67	4		
22	0	0	60	3	100	2	80	4	0	0	100	4	80	4	0	0	100	2	0	0
23	100	7	100	5	100	3	100	6	20	10	100	4	20	8			100	3		
24	100	1	0	0	100	4	20	5	0	0	100	5	0	0	0	0	80	6	40	3
25	20	2	40	3	40	3	20	3	0	0	80	2	0	0	0	0	80	2	60	2
26	*67*	*2*	*0*	*0*	*70*	*4*	*63*	*4*	*20*	*3*	*69*	*4*	*40*	*4*	*0*	*0*	*60*	*5*	*40*	*9*
27	100	2	0	0	100	8	100	7	0	0	100	5	0	0	0	0	100	9	60	11
28	0	0	0	0	100	3	100	3	0	0	100	3	0	0	0	0	100	3	0	0
29	60	1	0	0	80	2	40	3	0	0	0	0	0	0	0	0	0	0	0	0
30	100	1	0	0	100	4	60	5	0	0	100	4	0	0	0	0	6	0	0	0
31	20	3	0	0	0	0	40	4	0	0	40	4	60	4	0	0	0	0	0	0
32	0	0	0	0	20	3	80	3	0	0	60	4	0	0	0	0	60	3	0	0
33	20	2	0	0	40	4	20	3	0	0	20	4	0	0	0	0	20	4	0	0
34	0	0	0	0	0	0	100	2	0	0	20	2	20	4			60	3	20	6
35	0	0	0	0	100	5	40	3	0	0	100	4	0	0	0	0	20	6	0	0
36	100	1	0	0	20	3	0	0	20	3	80	3	0	0	0	0	0	0	0	0
37	*96*	*2*	*40*	*2*	*78*	*4*	*78*	*3*	*0*	*0*	*.88*	*4*	*80*	*2*	*0*	*0*	*52*	*3*	*0*	*0*

	DISEASES REPORTED WHICH WERE NOT PRINTED ON THE BLANKS, AMOUNT OF SICKNESS, ETC. ¶	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§
3	Mumps	80	1
9	Mumps	100	2
10	Bilious fever	100	3
	Croup	25	3
17	No severe sickness, no epidemic, Apr. 5. No change to note, Apr. 12. Season quite healthy, not much change, Apr. 19. Measles epidemic, but light, Apr. 26. Measles the most prevalent disease, not much change, May 3.		
20	Mild, weeks ending Apr. 5, 12, 19, and 26.		
22	But little sickness, Apr. 12. Very healthy, weeks ending Apr. 19 and 26. Diphtheria a little on the increase, May 3.		
23	In general less sickness than the week previous.—E. A. H., May 3.		
24	Peritonitis	20	6
25	Pleuro-pneumonia	20	3
27	Mumps	20	1
28	Bright's disease and Lithiasis, each	80	5
	Paralysis	60	5
	Anemia	20	4
29	But little sickness, Apr. 5, 12, and May 3. No general sickness, Apr. 19 and 26.		
30	Catarrh	60	5
	Pharyngitis	20	2
	Less sickness, April 12.		
32	Hepatitis	20	3
	Peritonitis	20	4
33	Increase of intermittent fever over week previous, Apr. 5 and 19. Less intermittent fever, May 3.		
35	Only one or two cases of well-marked typhoid fever, other cases seemingly of a mixed type; not prevailing to any extent, Apr. 12. A little latent malarial trouble about all at present noticeable, Apr. 19. Unusually healthy for the season, Apr. 26.		
39	Hemiplegia	33	5
	Catarrh	33	1
	Quinsy	33	2

38	100	4	40	2	100	3	60	6	0	0	100	4	0	0	0	0	0	0	0	0
39	100	3	0	0	100	2	67	3	0	0	67	2	0	0	0	0	100	3	0	0
40	0	0	0	0	0	0	25	1	0	0	75	2	0	0	0	0	0	0	0	0
41	100	3	0	0	100	4	100	2	0	0	100	4	0	0	0	0	20	4	0	0
42	100	1	0	0	80	9	100	4	0	0	100	8	0	0	0	0	100	3	0	0
43	100	1	0	0	0	0	0	0	0	0	80	3	0	0	0	0	40	3	0	0
44	80	2	0	0	20	4	100	2	0	0	80	2	80	2	0	0	20	3	0	0
45	*88*	*2*	*86*	*3*	*93*	*5*	*80*	*5*	*100*	*2*	*89*	*4*	*53*	*5*	*0*	*0*	*69*	*5*	*83*	*5*
46	0	0	0	0	0	0	100	3	0	0	80	3	40	5	0	0	20	4	60	4
47	100	2	0	0	100	7	100	8	0	0	100	5	0	0	0	0	60	3	80	11
48	100	3	0	0	100	4	100	5	0	0	100	4	80	6	0	0	60	9	80	6
49	0	0	0	0	100	6	100	6	0	0	100	3	0	0	0	0	100	5	0	0
50	----	----	----	----	----	----	----	---	----	----	100	2	----	----	----	----	100	5	----	----
51	100	2	75	2	0	0	50	3	100	2	100	2	75	2	0	0	75	2	100	2
52	100	1	0	0	0	0	100	3	0	0	60	6	80	7	0	0	40	5	100	4
53	100	2	0	0	100	6	40	7	0	0	80	7	0	0	0	0	100	2	0	0
54	100	1	0	0	100	4	80	4	0	0	100	5	0	0	0	0	100	4	0	0
55	100	5	0	0	100	3	100	2	0	0	100	5	0	0	0	0	60	5	0	0
56	20	3	0	0	10	3	20	3	0	0	100	3	0	0	0	0	40	4	0	0
57	0	0	100	3	100	3	0	0	0	0	0	0	33	4	0	0	0	0	0	0
58	100	2	0	0	100	6	80	9	0	0	100	6	20	8	0	0	80	9	0	0
59	60	2	0	0	0	0	0	0	0	0	40	3	40	2	0	0	0	0	0	0
60	*88*	*3*	*47*	*9*	*84*	*5*	*92*	*6*	*60*	*16*	*89*	*4*	*76*	*6*	*0*	*0*	*74*	*5*	*100*	*11*
61	100	3	100	9	100	5	100	9	0	0	100	5	100	8	0	0	100	7	100	11
62	100	3	20	14	100	4	100	7	0	0	100	4	100	6	0	0	100	12	0	0
63	100	4	0	0	100	10	100	8	60	16	100	6	100	9	0	0	100	1	0	0
64	100	2	0	0	60	6	80	5	0	0	40	5	0	0	0	0	40	7	0	0
65	75	2	0	0	100	3	75	3	0	0	100	4	50	5	0	0	100	2	0	0
66	100	1	0	0	60	3	0	0	0	0	0	0	0	0	0	0	40	2	0	0
67	100	2	0	0	100	7	100	6	0	0	100	4	80	7	0	0	100	6	0	0
68	60	5	20	4	100	3	80	5	0	0	100	1	0	0	0	0	0	0	0	0
69	40	2	0	0	60	2	0	0	0	0	60	2	20	3	0	0	20	4	0	0
70	100	3	0	0	60	7	100	6	0	0	100	4	0	0	0	0	0	0	0	0

	Anæmia	33	6
	Epithelial cancer and acute nephritis, each	33	7
42	Pharyngitis	40	5
44	Dyspepsia	60	3
	Peritonitis, cervicitis uteri, meningitis, stomatitis, and albuminuria, each	20	3
	Metritis	40	3
	Gastralgia	40	4
	Vaginitis, granular eyelids, and spinal irritation, each	20	4
46	Peritonitis	60	4
	Pleuritis	40	5
	Mumps and enteritis, each	20	5
47	Very small amount of sickness, Apr. 12.		
49	See foot-note 49, bottom of this page.		
	Pharyngitis	100	3
	Nasal catarrh	60	3
50	Syphilis	100	6
51	Mumps	50	2
	Croup	25	2
	All cases of an inflammatory nature are unusually severe, Apr. 12.		
52	Laryngitis	80	3
	Genuineness of diphtheria questioned. Decrease in general amount of sickness, May 3.		
55	Endocarditis	20	9
56	Meningitis and gallstone, each	20	4
	Phlebitis	40	4
58	Pharyngitis and catarrh, each	100	5
	Continues healthy, three weeks ending May 3.		
59	Ulcerated throat	40	4
	See foot-note 59, bottom of this page.		
61	Pharyngitis	40	9
	Otitis media	20	14
62	Mumps	100	12
63	Quite healthy, 5 weeks ending May 3. Colds constitute the chief ailment; weather fine but cold and dry for time of year, May 3. Genuineness of croup and diphtheria questioned.		
66	An erysipelatous tendency in many cases, Apr. 5. Nearly everything has an erysipelatous aspect, manifested in traumatic form also, Apr. 12. It is quite remarkable, the tendency of everything to take on erysipelas, Apr. 14. Influenza again more severe, Apr. 19. healthy, Apr. 26 and May 3.		
68	Anasarca	40	6
	Congestion of liver	40	4
	Dyspepsia	100	2
	Pharyngitis, Herpes, and malaria, each	20	4
	Pleuritis, and petechiæ, each	20	5
	Malarial toxæmia	20	6
	Purpura	60	5
	Scrofulosis	60	4
69	Mumps	40	2
	Infantile convulsions	20	1
	Urticaria	40	3
	Varicella	20	3

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‡, § For explanations and references, see pages 390–1.

¶ The several numbered lines on these two pages continue statements for the localities and divisions which are named and have the same line-numbers on pages 398–9. On the right side of the page the numbers before the side-notes are the line-numbers of the localities on pages 398–9, to which the side-notes refer.

49 During this week it has been dry and warm, and there has been a quite material lessening of all acute diseases. March, and April thus far, have been marked for a large number of diseases of the mucous membrane of the respiratory passages, not generally very severe, or protracted. The weather, up to a week ago, has been cold, and the spring backward.—Apr. 26. The past week, up to Friday, has been cold and dry—north wind. Warmer south wind Friday, with gentle rain on Saturday. An increase of acute diseases of mucous membrane of respiratory passages, and of rheumatism. Malarial influence shown in prevalence of neuralgia and a considerable number of light cases of intermittent and remittent fevers. Quinine, cinchonidia, and other tonics, used freely in most cases. In my previous rating of "consumption," if it is understood as showing the ratio between it and bronchitis and other acute diseases [Not intended to be so understood.—H. B. B.], I am satisfied that "9" is too high. There are but few cases of that disease, as compared with the acute diseases. It would be a mere guess at the ratio.—May 3.—S. S. C.

59 Influenza is prevalent, Apr. 12. Scarlet fever, which has been with us since Aug., has entirely subsided, Apr. 5. After a total subsidence for three weeks, scarlatina has again broken out; the cases occurred in the extremes of the city, where contagion was impossible; children of 2 to 3 years were the subjects and came down together on the same day.—April 27.

TABLE 3.—CONTINUED.—*Diseases, by Localities in Michigan, Four Weeks ending* **May** *31, 1879.*

Line Number.	Divisions and Localities Represented, and Initials of Physicians who Reported*. (Health Officers in italics; those also Correspondents marked with a *.)	Reports Received.	Bronchitis.		Cerebro-Spinal Men'gitis.		Cholera Infantum.		Cholera Morbus.		Consumption, Pulmonary.		Croup, Membraneous.		Diphtheria.		Diarrhea.		Dysentery.		Erysipelas.		Fever, Intermittent.		Fever, Remittent.		Fever, Typhoid (Enteric).		Fever, Typho-Malarial.	
			Per cent of Weeks Present ‡	Av. Order of Prevalence when Present §	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§
1	ALL LOCALITIES.........‖	268	84	3.6	25	3.0	33	10.0	45	6.6	85	5.2	38	6.4	56	5.5	66	6.0	50	9.1	66	5.6	93	1.9	83	3.2	40	7.6	62	7.3
2	UPPER-PENIN. DIV......†	8	88	3	0	0	0	0	0	0	88	3	0	0	0	0	0	0	0	0	0	0	38	6	0	0	25	5	0	0
3	Houghton—H. W. J.....	4	75	4	0	0	0	0	0	0	100	1	0	0	0	0	0	0	0	0	0	0	50	5	0	0	25	5	0	0
4	Ishpeming—*W. T. C.*...*	4	100	2	0	0	0	0	0	0	75	4	0	0	0	0	0	0	0	0	0	0	25	6	----	----	0	0	----	----
5	NORTH-WESTERN DIV..†	4	0	0	0	0	0	0	0	0	25	2	0	0	0	0	25	3	0	0	25	2	75	2	0	0	0	0	0	0
6	Cadillac—*J. M. W.*......	4	0	0	0	0	0	0	0	0	25	2	0	0	0	0	25	3	0	0	25	2	75	2	0	0	0	0	0	0
7	WESTERN DIV...........†	20	100	4	0	0	0	0	88	9	75	8	0	0	50	7	88	9	67	11	100	7	94	2	95	3	25	7	50	6
8	Cedar Springs—C. S. F..	4	0	0	0	0	0	0	75	6	25	7	0	0	0	0	75	6	50	8	100	4	100	1	100	3	0	0	0	0
9	Grand Haven—*A. V.*..*	4	100	4	0	0	0	0	0	0	0	0	0	0	25	6	0	0	0	0	0	0	75	1	75	2	25	7	50	6
10	Grand Rapids—A. H.....	4	100	4	0	0	0	0	0	0	100	5	0	0	75	7	0	0	0	0	100	7	100	6	100	1	0	0	0	0
11	Holland—*B. L.*...........	4	100	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	3	0	0	100	1	0	0	0	0
12	Muskegon—*O. C. W.*...	4	100	6	0	0	0	0	100	12	100	12	0	0	0	0	100	11	100	13	100	12	100	1	100	8	0	0	0	0
13	NORTHERN-CENT. DIV..†	4	0	0	0	0	0	0	0	0	0	0	0	0	75	3	0	0	0	0	75	3	100	1	25	5	0	0	0	0
14	Big Rapids—*I. W. B.*...	4	0	0	0	0	0	0	0	0	0	0	0	0	75	3	0	0	0	0	75	3	100	1	25	5	0	0	0	0
15	BAY AND EAST'N DIV...†	33	91	4	0	0	0	0	25	8	82	5	31	6	62	7	68	6	0	0	79	6	100	2	87	5	25	5	50	9
16	Bay City—W. H. B.....	4	100	6	0	0	0	0	0	0	100	8	0	0	75	12	100	9	0	0	100	11	100	2	100	5	0	0	25	12
17	Bay City—W. R. M.....	4	100	4	0	0	0	0	0	0	100	5	25	5	0	0	0	0	0	0	0	0	100	1	100	6	0	0	0	0
18	Lapeer—A. N...........	4	75	8	0	0	0	0	25	10	100	7	50	8	100	6	50	5	0	0	0	0	100	2	0	0	0	0	75	5
19	Port Huron—A. A. W..	4	100	4	0	0	0	0	25	6	75	5	0	0	25	6	25	6	0	0	75	6	100	1	75	3	0	0	0	0
20	Saginaw City—*E. A. H.*	4	50	7	----	----	----	----	----	----	50	8	25	8	75	8	100	5	----	----	----	----	100	2	100	6	25	5	----	----
21	Saginaw City—N. D. L.	2	100	3	0	0	0	0	0	0	50	4	0	0	50	4	0	0	0	0	50	4	100	1	0	0	0	0	0	0
22	St. Clair—*C. G. R.*	3	100	2	0	0	0	0	0	0	100	3	0	0	33	5	67	3	0	0	0	0	100	2	33	4	0	0	0	0
23	Thornville—J. S. C.....	4	100	2	0	0	0	0	0	0	100	5	0	0	0	0	0	0	0	0	0	0	100	1	0	0	0	0	0	0
24	W. Bay City—*J. W. H.*.	4	100	3	0	0	0	0	0	0	50	3	25	3	0	0	0	0	0	0	75	3	100	2	100	3	0	0	0	0
25	CENTRAL DIV.......... .†	59	73	3	0	0	33	10	29	7	80	5	38	6	40	5	80	5	25	4	54	4	96	2	80	3	0	0	40	8
26	Charlotte—G. B. A......	3	100	3	0	0	33	10	33	11	100	11	0	0	33	13	100	6	0	0	0	0	100	1	100	7	0	0	0	0
27	Charlotte—*P. D. P.*....	3	100	5	0	0	0	0	0	0	100	8	0	0	0	0	33	7	0	0	67	8	100	2	100	1	0	0	33	8
28	Corunna—*A. G. B.*......	3	33	2	0	0	0	0	0	0	100	8	67	10	100	6	100	6	0	0	100	4	100	2	100	3	0	0	0	0
29	DeWitt—G. W. T.......	4	100	1	0	0	0	0	0	0	100	5	0	0	25	5	0	0	0	0	0	0	100	3	100	3	0	0	0	0
30	Greenville—*J. M.*........	2	100	9	0	0	0	0	0	0	100	7	0	0	0	0	0	0	0	0	100	2	100	2	100	4	0	0	50	7
31	Hastings—A. P. D......	4	0	0	0	0	0	0	0	0	75	2	25	2	25	3	0	0	0	0	25	3	100	1	0	0	0	0	0	0
32	Howard City—J. R. H..	2	100	2	0	0	0	0	0	0	50	7	50	6	0	0	100	9	0	0	50	5	100	2	0	0	0	0	0	0
33	Hubbardston—H. W. B.	4	0	0	0	0	0	0	0	0	50	4	0	0	0	0	0	0	0	0	0	0	50	1	0	0	0	0	0	0
34	Ionia—H. of Cor., W. F. R..	4	50	2	0	0	0	0	0	0	0	0	0	0	0	0	75	3	0	0	25	3	100	2	50	4	0	0	0	0
35	Ionia—*S. V. R.*...........	4	50	5	0	0	0	0	0	0	75	4	0	0	0	0	0	0	25	4	0	0	100	1	100	2	0	0	0	0
36	Ithaca—I. N. M..........	4	25	3	0	0	0	0	0	0	25	3	0	0	25	3	0	0	0	0	50	3	100	3	25	3	0	0	0	0
37	Lansing—*J. H. W.*......	2	100	6	0	0	0	0	0	0	100	5	0	0	0	0	100	5	0	0	100	5	100	2	50	1	0	0	0	0

38	North Lansing—O. M.	4	75	3	0	0	0	0	0	0	100	3	25	4	75	2	0	0	0	0	25	4	100	1	50	3	0	0	0	0
39	Otisville—A. W. N.	4	100	2	0	0	0	0	0	0	100	2	0	0	25	5	50	3	0	0	0	0	100	1	0	0	0	0	0	0
40	Ovid—O. B. C.	4	75	2	0	0	0	0	0	0	25	4	0	0	0	0	0	0	0	0	0	0	0	0	100	2	0	0	0	0
41	Vernon—D. C. H.	4	100	4	0	0	0	0	25	3	100	5	0	0	0	0	100	2	0	0	0	0	100	1	100	3	0	0	0	0
42	Webberville—R. B. S.	4	25	3	0	0	0	0	0	0	100	2	0	0	25	2	0	0	0	0	0	0	100	1	75	2	0	0	0	0
43	SOUTH-WESTERN DIV. †	*29*	*53*	*4*	*25*	*3*	*0*	*0*	*43*	*4*	*92*	*4*	*25*	*8*	*43*	*4*	*45*	*5*	*0*	*0*	*53*	*5*	*96*	*2*	*61*	*3*	*0*	*0*	*50*	*5*
44	Allegan—H. S. L.	4	25	5	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	0	0	100	3	100	5	0	0	0	0
45	Dowagiac—*E. C. P.*	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	1	50	2	0	0	25	3
46	Mattawan—T. H. B.	2	0	0	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
47	New Troy—G. H. R.	4	0	0	0	0	0	0	0	0	75	2	0	0	0	0	0	0	0	0	75	2	75	2	50	2	0	0	0	0
48	Niles—J. S. R.	4	100	3	0	0	0	0	0	0	100	5	25	8	0	0	75	9	0	0	75	11	100	5	0	0	0	0	75	7
49	Niles—*O. P. H.* and *I. S.*	3	100	5	0	0	0	0	33	5	67	6	0	0	33	5	33	3	0	0	33	3	100	1	33	2	0	0	0	0
50	Otsego—M. C.	4	25	4	0	0	0	0	0	0	100	3	0	0	50	2	0	0	0	0	25	3	100	1	25	3	0	0	0	0
51	Paw Paw—J. A.	4	25	3	25	3	0	0	50	3	100	3	0	0	0	0	25	3	0	0	0	0	100	2	100	1	0	0	0	0
52	SOUTH'N-CENT. DIV. †	*67*	*90*	*3*	*0*	*0*	*0*	*0*	*40*	*6*	*85*	*5*	*75*	*10*	*67*	*5*	*64*	*6*	*50*	*7*	*57*	*6*	*93*	*2*	*89*	*3*	*0*	*0*	*67*	*6*
53	Adrian—*A. M. S.*	4	75	2	0	0	0	0	50	4	75	3	0	0	0	0	0	0	25	4	25	3	100	2	0	0	0	0	0	0
54	Albion—J. P. S.	4	100	5	0	0	0	0	25	9	100	7	0	0	0	0	100	9	100	10	100	8	100	2	100	5	0	0	0	0
55	Battle Creek—*S. S. F.* *	3	----	----	----	----	----	----	----	----	100	6	----	----	----	----	33	6	----	----	100	5	100	1	100	2	----	----	67	8
56	Brooklyn—E. N. P.	4	0	0	0	0	0	0	0	0	0	0	0	0	75	3	0	0	0	0	0	0	100	1	0	0	0	0	0	0
57	Clinton—A. W. A.	4	75	5	0	0	0	0	0	0	100	6	0	0	0	0	50	7	25	8	25	7	100	2	75	4	0	0	0	0
58	Coldwater—S. S. C.	4	100	1	0	0	0	0	0	0	100	12	75	10	100	9	100	8	0	0	25	9	100	3	100	6	0	0	0	0
59	Coldwater—*G. F. F.*	2	100	3	0	0	0	0	0	0	100	9	0	0	100	6	100	6	0	0	0	0	100	1	0	0	0	0	0	0
60	Jackson—Prison, E. L. K.	4	100	1	----	----	----	----	----	----	100	4	----	----	----	----	----	----	----	----	25	7	100	3	----	----	----	----	----	----
61	Jackson—*P. P.*	3	67	3	0	0	0	0	67	3	33	3	----	----	33	2	67	3	0	0	100	2	100	2	0	0	0	0	67	3
62	Jackson—W. W.	4	100	3	0	0	0	0	0	0	100	2	0	0	25	6	0	0	0	0	0	0	50	5	100	2	0	0	0	0
63	Kalamazoo—W. B. S.	4	0	0	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	0	0	100	1	100	2	0	0	0	0
64	Marshall—*B. A. G.*	4	0	0	0	0	0	0	----	----	50	1	0	0	0	0	50	1	0	0	0	0	75	2	0	0	----	----	0	0
65	Marshall—H. L. J.	4	75	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	1	25	2	0	0	0	0
66	Mendon—H. C. C.	3	100	3	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	33	7	100	2	100	1	0	0	0	0
67	Mendon—E. S.	4	100	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	4	100	2	100	2	0	0	0	0
68	Three Rivers—C. W. B.	4	100	3	0	0	0	0	25	8	100	9	0	0	0	0	25	4	0	0	100	4	100	1	100	3	0	0	0	0
69	Union City—N. H. C.	4	75	2	0	0	0	0	0	0	100	4	0	0	75	4	0	0	0	0	0	0	100	2	0	0	0	0	0	0
70	Ypsilanti—*E. B.* *	4	0	0	0	0	0	0	0	0	25	3	0	0	0	0	0	0	0	0	0	0	100	1	0	0	0	0	0	0
71	SOUTH-EASTERN DIV. †	*44*	*97*	*4*	*0*	*0*	*0*	*0*	*50*	*6*	*100*	*6*	*0*	*0*	*100*	*11*	*63*	*8*	*38*	*13*	*81*	*10*	*91*	*2*	*91*	*3*	*63*	*11*	*100*	*11*
72	Detroit—L. C.	4	100	3	0	0	0	0	0	0	100	5	0	0	0	0	100	14	50	16	100	14	100	2	100	13	0	0	100	12
73	Detroit—*E. L.*	4	100	7	0	0	0	0	0	0	100	9	0	0	100	11	25	10	25	10	100	12	100	1	100	1	25	9	100	9
74	Detroit—W. H. R.	4	100	5	0	0	0	0	0	0	100	7	0	0	0	0	100	11	0	0	100	11	100	2	100	1	100	12	0	0
75	Milford—R. J.	4	100	2	0	0	0	0	0	0	100	4	0	0	0	0	25	5	0	0	0	0	100	1	0	0	0	0	0	0
76	Monroe—*A. J. M.*	4	0	0	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	25	3	25	1	75	1	0	0	0	0
77	Northville—J. M. S.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	1	75	2	0	0	0	0
78	Pontiac—W. G. E.	4	100	2	0	0	0	0	0	0	100	8	0	0	0	0	100	7	0	0	0	0	100	1	0	0	0	0	0	0
79	Utica—G. G. R.	4	0	0	0	0	0	0	0	0	100	7	0	0	0	0	25	5	0	0	0	0	100	1	100	2	0	0	0	0
80	Washington—A. Y.	4	100	3	0	0	0	0	50	6	100	3	0	0	0	0	100	4	0	0	0	0	75	5	0	0	0	0	0	0
81	Wyandotte—E. P. C.	4	75	4	----	----	----	----	----	----	100	3	----	----	----	----	25	5	----	----	----	----	100	1	75	3	----	----	----	----
82	Wyandotte—*T. J. L.*	4	100	5	0	0	0	0	0	0	100	7	0	0	0	0	0	0	0	0	0	0	100	2	100	3	0	0	0	0

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*, †, ‡, §, ‖. For explanations and references, see pages 390-1.

Health good. Three or four cases of diphtheria reported, one fatal. This was complicated with lung fever.—*Rev. A. W. Bill, of Menominee, on May Meteorological Register.*

LINE 70.—Many cases of consumption and hæmoptysis have developed themselves.—May 10. Isolated cases of scarlet fever occur, but not more than one or two at a time and in points far distant from each other. May 17. Isolated cases of scarlet fever still occur, 5 cases in one house, no others in the city; general good health prevails.—May 24.—*E. Batwell, M. D., of Ypsilanti.*

LINE 77.—Many cases of cough, soreness in the pectoral region, head sore and nasal passages obstructed, called by them "a cold;" this difficulty is unyielding to treatment.—May 10 and 17.—*J. M. Swift, M. D., of Northville.*

TABLE 3.—*Diseases by Localities in Michigan Four Weeks ending* **May** *31, 1879*—CONTINUED.

LINE NUMBER. ¶	Influenza.		Measles.		Neuralgia.		Pneumonia.		Puerperal Fever.		Rheumatism.		Scarlatina.		Small-pox.		Tonsillitis.		Whooping-Cough.	
	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.§	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§
1	77	3.2	77	3.2	81	4.1	61	5.4	30	7.6	83	4.2	78	4.3	25	5.0	63	4.2	70	6.4
2	75	2	0	0	100	4	25	6	0	0	63	4	50	4	0	0	63	3	100	2
3	50	3	0	0	100	4	25	6	0	0	25	5	0	0	0	0	50	4	0	0
4	100	1	0	0	100	4	25	5	0	0	100	3	50	4	0	0	75	2	100	2
5	*0*	*0*	*0*	*0*	*0*	*0*	*25*	*2*	*0*	*0*	*0*	*0*	*100*	*1*	*0*	*0*	*25*	*2*	*0*	*0*
6	0	0	0	0	0	0	25	2	0	0	0	0	100	1	0	0	25	2	0	0
7	*75*	*3*	*50*	*7*	*94*	*5*	*75*	*6*	*25*	*7*	*100*	*6*	*75*	*4*	*0*	*0*	*65*	*4*	*50*	*7*
8	50	4	0	0	75	5	25	6	0	0	100	6	0	0	0	0	75	8	0	0
9	75	3	0	0	0	0	100	5	0	0	100	5	0	0	0	0	25	3	0	0
10	100	2	50	7	100	6	75	7	25	7	0	0	100	7	0	0	100	3	50	7
11	50	3	0	0	100	3	75	3	0	0	100	3	25	3	----	----	25	3	----	----
12	100	3	0	0	100	5	100	7	0	0	100	8	100	3	0	0	100	4	----	----
13	*0*	*0*	*0*	*0*	*50*	*4*	*50*	*4*	*0*	*0*	*100*	*3*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
14	0	0	0	0	50	4	50	4	0	0	100	3	0	0	0	0	0	0	0	0
15	*85*	*4*	*90*	*3*	*86*	*5*	*71*	*7*	*38*	*9*	*87*	*5*	*83*	*4*	*0*	*0*	*44*	*4*	*75*	*6*
16	100	4	100	1	50	9	100	11	0	0	100	3	0	0	0	0	----	----	100	8
17	100	3	100	2	----	----	100	6	0	0	100	6	0	0	0	0	----	----	100	7
18	100	2	75	5	----	----	100	9	50	10	100	10	0	0	0	0	25	5	0	0
19	0	0	100	3	----	----	25	6	25	7	50	6	100	4	0	0	----	----	50	6
20	100	6	100	3	100	3	75	4	----	----	100	4	----	----	----	----	75	5	----	----
21	0	0	100	3	100	2	0	0	0	0	100	3	50	3	0	0	100	4	0	0
22	0	0	33	1	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0
23	0	0	0	0	100	4	0	0	0	0	100	3	0	0	0	0	25	4	0	0
24	25	3	100	2	0	0	25	3	0	0	50	3	0	0	0	0	25	3	50	2
25	*76*	*3*	*61*	*3*	*79*	*4*	*41*	*5*	*0*	*0*	*78*	*4*	*63*	*5*	*0*	*0*	*67*	*5*	*100*	*5*
26	100	3	0	0	100	8	100	6	0	0	100	3	0	0	0	0	100	6	100	9
27	100	4	0	0	67	7	33	10	0	0	100	7	0	0	0	0	67	7	100	4
28	100	4	0	0	100	6	33	9	0	0	100	7	0	0	0	0	67	10	0	0
29	0	0	0	0	100	3	25	4	0	0	100	4	0	0	0	0	100	2	0	0
30	0	0	100	3	100	4	50	8	0	0	100	5	0	0	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	3	0	0
32	0	0	0	0	100	5	50	4	0	0	100	7	100	5	0	0	100	7	0	0
33	0	0	25	3	0	0	0	0	0	0	50	4	----	----	0	0	0	0	0	0
34	0	0	25	3	100	2	0	0	0	0	75	2	0	0	0	0	100	3	0	0
35	0	0	75	3	0	0	25	2	0	0	0	0	0	0	0	0	0	0	0	0

	DISEASES REPORTED WHICH WERE NOT PRINTED ON THE BLANKS, AMOUNT OF SICKNESS, ETC. ¶	Per cent of Weeks Present.‡	Av. Order of Prev. when Present.§
3	Mumps	100	2
4	One case of intermittent fever imported, week ending May 31.		
10	Mumps	100	6
17	Not much change, but little sickness, mostly chronic.		
20	In general the city was healthy,—w'k ending May 24.		
21	Very healthy.—May 31.		
22	Not much sickness.		
23	Peritonitis	25	5
29	Anæmia	50	3
	Colic	25	4
	Cerebral hyperæmia	50	5
	Dysmenorrhea, paralysis, and pleurisy, each	25	5
31	No prevailing disease, 2 weeks ending May 17. Diphtheria and tonsilitis, one case each, very mild.—May 31.		
34	Laryngitis	50	3
	Febricula	25	4
38	Many cases of chicken-pox, 2 weeks ending May 31.		
39	See note 39, below.		
41	See note 41 for May, page 434.		
45	Sickness very light.—May 17.		
46	Bright's disease	50	2
	Cancer, stomach	50	4
	Chorea	50	3
48	See note 48 for May, page 434.		
49	Generally very healthy.—May 10.		
	Carcinoma	67	9
	Mumps	33	2
50	Mumps	25	4
	Diphtheria in the village for the first time in 2 years; 5 cases in one family.—May 24.		
51	Dyspepsia	75	3
	Cystitis	100	3
	Locomotor ataxy, vaginitis, nephritis, gonorrhea, paralysis, synovitis, gastralgia, metritis, and amenorrhea, each	25	3
	Spinal irritation	50	3
	Syphilis	25	2
54	Small amount of sickness.—May 17.		
55	Laryngitis is and has been somewhat prevalent.—May 17.		
57	Paralysis	25	10

36	0	0	100	2	100	2	0	0	0	0	100	3	0	0	0	0	75	3	100	2
37	0	0	0	0	100	4	50	1	0	0	100	8	50	5	0	0	50	8	0	0
38	0	0	0	0	0	0	0	0	0	0	50	4	0	0	0	0	50	3	0	0
39	25	2	0	0	50	4	25	4	0	0	25	3	0	0	0	0	0	0	0	0
40	0	0	0	0	25	3	50	4	0	0	75	3	50	4	0	0	25	3	0	0
41	0	0	0	0	100	5	25	5	0	0	100	3	0	0	0	0	100	4	0	0
42	75	3	0	0	25	3	50	3	0	0	50	3	0	0	0	0	25	2	0	0
43	77	3	100	2	66	3	55	3	0	0	80	4	50	1	0	0	48	4	0	0
44	0	0	100	2	100	2	0	0	0	0	100	4	0	0	0	0	0	0	0	0
45	0	0	0	0	50	3	0	0	0	0	25	3	0	0	0	0	25	2	0	0
46	100	2	0	0	100	1	0	0	0	0	50	4	50	1	0	0	50	4	0	0
47	0	0	0	0	25	2	50	2	0	0	0	0	0	0	0	0	50	2	----	----
48	100	2	0	0	100	9	75	4	0	0	100	8	0	0	0	0	100	3	0	0
49	67	4	0	0	100	4	33	3	0	0	67	5	0	0	0	0	33	7	0	0
50	50	2	0	0	25	3	0	0	0	0	100	3	0	0	0	0	25	3	0	0
51	0	0	0	0	50	3	0	0	0	0	100	3	0	0	0	0	----	----	0	0
52	71	3	55	3	83	4	75	6	25	4	84	4	82	4	0	0	73	4	52	8
53	0	0	0	0	25	3	100	3	0	0	50	3	0	0	0	0	75	3	0	0
54	100	4	75	3	100	6	100	7	0	0	100	7	0	0	0	0	50	4	25	12
55	67	6	----	----	----	----	33	4	----	----	67	5	----	----	----	----	100	2	----	----
56	0	0	0	0	0	0	25	3	25	4	75	2	0	0	0	0	0	0	0	0
57	25	4	0	0	100	3	0	0	0	0	100	2	75	8	0	0	50	8	0	0
58	0	0	0	0	100	5	100	9	0	0	100	3	0	0	0	0	100	7	25	11
59	0	0	0	0	100	2	100	10	0	0	100	5	0	0	0	0	100	5	50	8
60	----	----	----	----	----	----	----	----	----	----	100	2	----	----	----	----	100	5	----	----
61	67	2	67	2	67	3	0	0	0	0	100	2	100	2	0	0	100	2	67	3
62	75	2	25	5	0	0	0	0	0	0	100	4	100	5	----	----	25	6	100	4
63	100	4	0	0	0	0	0	0	0	0	0	0	100	5	0	0	100	3	0	0
64	25	1	0	0	0	0	0	0	0	0	50	1	25	1	0	0	0	0	0	0
65	75	1	0	0	----	----	50	4	0	0	75	3	0	0	0	0	----	----	0	0
66	0	0	0	0	100	3	100	4	0	0	100	5	0	0	0	0	0	0	0	0
67	0	0	0	0	100	4	0	0	0	0	100	4	0	0	0	0	75	4	0	0
68	100	4	0	0	100	7	0	0	0	0	100	7	0	0	0	0	0	0	50	9
69	0	0	0	0	100	3	0	0	0	0	100	5	0	0	0	0	25	1	0	0
70	0	0	0	0	25	3	0	0	0	0	25	3	100	2	0	0	0	0	0	0
71	81	4	92	5	89	5	70	6	25	10	84	4	82	6	25	5	68	5	63	8
72	75	6	100	6	100	4	75	10	25	10	100	3	100	9	0	0	100	6	100	9
73	100	2	75	7	100	3	100	9	0	0	100	5	100	5	0	0	100	7	0	0
74	100	4	0	0	100	9	100	6	0	0	100	8	100	12	0	0	100	4	0	0
75	100	3	0	0	0	0	25	5	0	0	25	5	0	0	0	0	0	0	0	0
76	0	0	0	0	100	3	75	3	0	0	100	3	25	3	0	0	0	0	0	0
77	100	2	0	0	----	----	0	0	0	0	25	2	0	0	0	0	----	----	0	0
78	100	3	0	0	100	6	100	6	0	0	100	4	0	0	0	0	25	5	0	0
79	50	4	0	0	50	3	100	5	0	0	75	4	100	5	25	5	0	0	25	6
80	0	0	100	2	75	4	50	5	0	0	100	1	0	0	0	0	25	4	0	0
81	----	----	----	----	----	----	50	4	----	----	100	3	75	3	----	----	25	3	----	----
82	25	5	0	0	0	0	25	8	0	0	100	4	75	3	0	0	100	5	----	----

58	Pharyngitis	75	3
	Nasal catarrh	25	5
	Bronchitis has lessened since last week; but rheumatism, throat disease, nasal catarrh (acute), and neuralgia are about the same. It is extremely dry, and the wind has been cold from the north until Friday. For two days it has been warm with wind southerly. There have been some cases of diptheria in the county, and some very light cases here; one death reported at Bronson, 12 miles west.—May 10. There have been some cases of throat-disease with false membrane, which some are not willing to call diphtheria; but the constitutional symptoms and the fact that there have been recent cases of that disease in this vicinity which were well marked have induced me to class some of them under that head. All acute diseases are generally not severe. We are having more rheumatism and intermittent fever than usual at this time. This place has been *very little* subject to the latter disease for many years, but it has prevailed, to some extent, this spring. A light rain, early in the week, but on the whole it is cool and *very dry*.—May 17. There are a few cases of diphtheria reported. If they are really of that nature they are light,—no deaths. I have heard of some severe cases at Union City in this county,—two deaths in one family.—May 24.		
60	Syphilis	100	6
61	Croup	33	2
62	Decrease in amount of sickness.—May 10. Sickness light, 3 weeks ending May 31. Bronchitis marked infantile.		
66	Endocarditis	33	7
	Peritonitis (chronic)	33	7
67	Dyspepsia	25	5
68	Catarrh	75	7
	Pharyngitis	75	7
	Have had more erysipelas in the past week than any period for two years.—May 10. Continues healthy, 3 weeks ending May 31.		
70	See note 70, page 403.		
73	Mumps	75	11
74	A slight increase of influenza.—May 24. Very little sickness.		
76	The month has been unusually healthy.—May 31.		
77	See note 77, page 403.		
80	Dyspepsia	100	3
	Malaria and scrofulosis, each	100	4
	Cystitis and asthma (spasmodic) each	25	4
	Purpura	25	5
	Congestion of liver	50	5
81	Mumps	25	2
82	Over 30 cases of scarlatina in the city,—one death, week ending May 24. About the same, no deaths, week ending May 31.		

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‡ § For explanations and references, see foot-notes on pages 390–1.

¶ The several numbered lines on these two pages continue statements for the localities and divisions which are named and have the same line-numbers on the two preceding pages. On the right side of the page the numbers before the side-notes are the line-numbers of the localities, on pages 402–3, to which the side-notes refer.

39 Intermittent fever less prevalent, May 24. Much less general sickness, intermittent fever in particular.—May 13.

TABLE 3—CONTINUED.—*Diseases, by Localities in Michigan, Four Weeks ending* **June** *28, 1879.*

Line Number.	DIVISIONS AND LOCALITIES REPRESENTED, AND INITIALS OF PHYSICIANS WHO REPORTED.* (Health Officers in italics; those also Correspondents marked with a *.)	Reports Received.	Bronchitis.		Cerebro-Spinal Men'gitis.		Cholera Infantum.		Cholera Morbus.		Consumption, Pulmonary.		Croup, Membraneous.		Diphtheria.		Diarrhea.		Dysentery.		Erysipelas.		Fever, Intermittent.		Fever, Remittent.		Fever, Typhoid (Enteric.)		Fever, Typho-Malarial.	
			Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Preseot.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§
1	All Localities........‖	312	79	3.9	25	4.3	38	6.1	45	5.9	93	5.0	30	5.4	55	4.4	69	4.7	47	6.9	58	5.6	94	1.4	84	3.1	78	7.4	59	6.8
2	Upper-Penin. Div......†	7	67	1	0	0	25	4	50	3	71	2	25	4	0	0	50	4	50	4	43	4	33	2	0	0	100	4	0	0
3	Houghton—H. W. J......	4	0	0	0	0	25	4	50	3	100	1	25	4	0	0	50	4	50	4	25	4	0	0	0	0	100	4	0	0
4	Ishpeming—*W. T. C.*..*	3	67	1	----	----	0	0	0	0	33	2	0	0	0	0	0	0	0	0	67	4	33	2	----	----	----	----	----	----
5	North-Western Div..†	8	100	1	0	0	25	1	0	0	0	0	0	0	25	1	63	2	0	0	25	1	88	2	0	0	0	0	0	0
6	Cadillac—C. E. M.......	4	100	1	0	0	0	0	0	0	0	0	0	0	25	1	75	2	0	0	0	0	100	3	0	0	0	0	0	0
7	Cadillac—*J. M. W.*.......	4	0	0	0	0	25	1	0	0	0	0	0	0	0	0	50	1	0	0	25	1	75	1	0	0	0	0	0	0
8	North-Eastern Div. .†	3	33	3	0	0	33	3	33	2	0	0	0	0	0	0	100	2	100	3	33	4	33	2	67	3	0	0	0	0
9	Alpena—W. P. M.	3	33	3	0	0	33	3	33	2	0	0	0	0	0	0	100	2	100	3	33	4	33	2	67	3	0	0	0	0
10	Western Division....†	20	69	5	0	0	0	0	56	6	100	8	0	0	25	6	75	7	50	12	83	6	100	1	90	2	0	0	25	3
11	Cedar Springs—C. S. F.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75	4	100	1	100	2	0	0	25	3
12	Grand Haven—*A. V.*..*	4	50	3	----	----	----	----	50	4	----	----	----	----	25	4	50	3	----	----	----	----	100	2	50	2	----	----	----	----
13	Grand Rapids—A. H....	4	50	6	0	0	0	0	25	7	100	5	0	0	25	7	0	0	0	0	0	0	100	1	100	2	0	0	0	0
14	Holland—*B. L.*...........	4	75	3	0	0	0	0	50	3	0	0	0	0	0	0	0	0	0	0	75	2	0	0	100	1	0	0	0	0
15	Muskegon—*O. C. W.* ...	4	100	8	0	0	0	0	100	9	100	10	0	0	0	0	100	11	50	12	100	12	100	1	100	2	0	0	0	0
16	North'n Central Div.†	4	25	5	0	0	0	0	50	4	25	5	0	0	50	3	25	2	0	0	75	3	100	1	25	5	0	0	0	0
17	Big Rapids—*I. W. B.*...	4	25	5	0	0	0	0	50	4	25	5	0	0	50	3	25	2	0	0	75	3	100	1	25	5	0	0	0	0
18	Bay and Eastern Div.†	40	89	4	0	0	33	8	63	7	100	6	38	7	54	5	68	4	30	5	46	6	100	1	78	4	0	0	65	7
19	Bay City—W. H. B......	4	100	7	0	0	50	8	50	12	100	9	0	0	0	0	100	5	0	0	25	11	100	1	100	4	----	----	100	12
20	Bay City—W. R. M.....	4	100	3	0	0	0	0	0	0	100	5	0	0	0	0	50	5	0	0	0	0	100	1	100	6	0	0	0	0
21	Lapeer—A. N...........	4	0	0	0	0	25	10	75	7	100	9	0	0	25	7	100	3	0	0	0	0	100	1	75	5	0	0	100	4
22	Port Huron—A. A. W..	4	100	4	0	0	25	5	0	0	100	7	0	0	75	5	75	6	25	6	25	6	100	1	50	3	0	0	50	6
23	Saginaw City—*E. A. H.*	4	100	5	----	----	----	----	50	6	100	6	50	10	25	7	100	4	25	9	50	9	100	2	100	6	----	----	25	10
24	Saginaw City—N. D. L..	4	100	3	0	0	0	0	0	0	100	4	25	4	75	4	50	3	25	5	25	5	100	1	25	5	0	0	50	4
25	St. Clair—*C. G. R.*........	4	75	4	0	0	0	0	0	0	100	4	0	0	0	0	50	3	25	4	0	0	100	2	100	2	0	0	0	0
26	Thornville—J. S. C.....	4	100	2	0	0	0	0	0	0	100	6	0	0	0	0	25	5	0	0	25	5	100	1	0	0	0	0	0	0
27	W. Bay City—J. W. H..	4	25	3	0	0	0	0	0	0	0	0	0	0	50	3	25	2	50	3	75	2	100	2	50	1	0	0	0	0
28	W. Bay City—*I. E. R.*.*	4	100	4	0	0	0	0	75	4	100	3	0	0	75	2	100	3	0	0	100	4	100	2	100	2	0	0	0	0
29	Central Division.....†	71	71	4	25	5	75	10	50	6	96	5	0	0	57	5	75	4	25	6	71	5	92	1	82	3	0	0	45	8
30	Charlotte—G. B. A.....	4	100	4	0	0	100	10	25	12	100	13	0	0	50	12	100	3	0	0	0	0	100	1	100	6	0	0	25	12
31	Charlotte—*P. D. P.*.....	4	100	6	0	0	0	0	0	0	100	8	0	0	0	0	50	6	0	0	25	5	100	1	100	2	0	0	0	0
32	Corunna—*A. G. B.*......	4	25	6	0	0	0	0	0	0	100	5	0	0	100	5	75	6	0	0	100	5	100	1	100	3	0	0	25	10
33	DeWitt—G. W. T.......	4	100	3	0	0	0	0	0	0	100	5	0	0	50	5	0	0	0	0	0	0	100	1	100	2	0	0	0	0
34	Greenville—*J. M.*	4	50	9	0	0	50	9	50	9	100	6	0	0	0	0	50	8	25	9	100	4	100	1	100	3	0	0	75	7
35	Hastings—A. P. D......	3	0	0	0	0	0	0	0	0	100	2	0	0	0	0	0	0	0	0	0	0	100	1	33	3	0	0	0	0
36	Howard City—J. R. H..	4	100	4	0	0	0	0	75	7	100	7	----	----	----	----	100	7	----	----	75	5	100	1	50	6	0	0	0	0
37	Hubbardston—H. W. B.	4	0	0	0	0	0	0	0	0	50	7	0	0	0	0	0	0	0	0	50	6	50	1	50	2	0	0	0	0
38	Ionia (H. of C.)—W. F. R.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	3	0	0	0	0	100	1	100	3	0	0	0	0
39	Ionia—*S. V. R.*..........	4	0	0	0	0	0	0	0	0	100	4	0	0	0	0	0	0	0	0	0	0	100	2	100	3	0	0	0	0

40	Ithaca—I. N. M.	4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	75	2	25	3	----	----	----	----
41	Lansing—*J. H. W.*	4	100	5	25	5	0	0	50	4	100	4	0	0	50	3	100	4	0	0	0	0	100	1	100	2	0	0	25	4
42	Mason—*W. W. R.*	4	100	4	----	----	----	----	75	4	100	5	----	----	----	----	100	4	----	----	100	5	100	1	100	3	----	----	75	5
43	North Lansing—O. M.	4	25	3	0	0	0	0	0	0	100	3	0	0	50	2	0	0	0	0	0	0	100	1	0	0	0	0	0	0
44	Otisville—A. W. N.	4	25	2	0	0	0	0	0	0	100	2	0	0	50	3	25	3	0	0	0	0	100	1	25	4	0	0	0	0
45	Ovid—O. B. C.	4	50	4	0	0	0	0	25	2	0	0	0	0	0	0	0	0	0	0	0	0	25	2	100	2	0	0	0	0
46	Vernon—D. C. H.	4	50	4	25	5	0	0	0	0	100	5	0	0	0	0	100	3	0	0	0	0	100	1	100	2	0	0	0	0
47	Webberville—R. B. S.	4	100	3	0	0	0	0	0	0	0	0	0	0	50	4	75	2	25	2	50	3	100	2	100	2	0	0	0	0
48	SOUTH-WESTERN DIV.†	*39*	*75*	*4*	*25*	*3*	*0*	*0*	*25*	*4*	*94*	*4*	*25*	*5*	*63*	*4*	*46*	*4*	*0*	*0*	*33*	*6*	*85*	*1*	*100*	*3*	*0*	*0*	*50*	*3*
49	Allegan—H. S. L.	4	0	0	0	0	0	0	0	0	100	5	0	0	50	7	0	0	0	0	0	0	100	2	100	5	0	0	0	0
50	Cassopolis—F. G.	4	50	5	----	----	----	----	25	5	75	5	25	5	100	2	25	5	----	----	25	5	100	2	----	----	----	----	----	----
51	Dowagiac—*E. C. P.*	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	1	100	2	0	0	0	0
52	Mattawan—T. H. B.	3	0	0	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	33	2	0	0	0	0	0	0
53	New Troy—G. H. R.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75	2	0	0	0	0	75	1	100	2	0	0	25	3
54	Niles—J. S. R.	4	100	5	0	0	0	0	0	0	100	5	0	0	0	0	25	8	0	0	25	9	100	1	0	0	0	0	75	3
55	Niles—*I. S.*	4	100	3	0	0	0	0	0	0	100	4	25	4	0	0	75	6	0	0	0	0	100	1	0	0	0	0	0	0
56	Otsego—M. C.	4	0	0	0	0	0	0	0	0	100	4	0	0	75	2	0	0	0	0	0	0	100	1	0	0	0	0	0	0
57	Paw Paw—J. A.	4	50	3	25	3	0	0	25	2	100	3	0	0	0	0	50	3	0	0	0	0	100	2	100	2	0	0	0	0
58	St. Joseph—R. F. S.	4	0	0	0	0	0	0	0	0	75	2	0	0	25	3	25	2	0	0	50	3	75	1	100	2	0	0	0	0
59	SOUTH'N-CENTRAL DIV.†	*76*	*80*	*4*	*0*	*0*	*0*	*0*	*30*	*5*	*88*	*5*	*0*	*0*	*68*	*3*	*62*	*5*	*100*	*9*	*50*	*5*	*97*	*2*	*87*	*3*	*50*	*6*	*50*	*5*
60	Adrian—A. M. S.	4	100	2	0	0	0	0	0	0	50	4	0	0	50	3	25	3	0	0	0	0	100	1	0	0	0	0	0	0
61	Albion—J. P. S.	4	100	6	0	0	0	0	25	9	100	8	0	0	0	0	100	8	100	9	100	7	100	2	100	4	0	0	0	0
62	Battle Creek—*S. S. F.*.*	4	----	----	----	----	----	----	----	----	75	4	----	----	----	----	----	----	----	----	50	4	100	1	100	2	----	----	50	5
63	Brooklyn—E. N. P.	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	1	0	0	0	0	0	0
64	Centreville—M. S.	2	50	4	0	0	0	0	0	0	100	4	0	0	0	0	0	0	0	0	100	4	100	1	100	2	0	0	0	0
65	Clinton—A. W. A.	4	0	0	0	0	0	0	25	4	100	6	0	0	0	0	50	4	0	0	25	6	100	1	0	0	0	0	0	0
66	Coldwater—S. S. C.	4	100	8	0	0	0	0	0	0	0	0	0	0	100	4	100	7	0	0	50	10	100	1	100	7	0	0	0	0
67	Coldwater—*G. V. V.*	4	75	6	0	0	0	0	0	0	100	5	0	0	100	5	50	4	0	0	25	7	100	2	0	0	0	0	0	0
68	Hillsdale—*J. W. F.* *	2	100	4	0	0	0	0	0	0	100	3	0	0	0	0	100	3	0	0	100	3	100	1	0	0	0	0	0	0
69	Jackson (Prison)—E. L. K.	4	100	1	----	----	----	----	----	----	100	4	----	----	----	----	25	7	----	----	----	----	100	3	----	----	----	----	----	----
70	Jackson—*P. P.*	2	100	2	0	0	0	0	50	3	100	3	0	0	0	0	0	0	0	0	0	0	100	2	0	0	100	3	0	0
71	Jackson—W. W.	4	50	5	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	100	5	100	2	25	8	0	0
72	Kalamazoo—W. B. S.	4	0	0	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	0	0	100	1	100	2	0	0	0	0
73	Marshall—*B. A. G.*	3	----	----	0	0	0	0	0	0	0	0	0	0	33	1	0	0	0	0	0	0	33	1	33	1	0	0	0	0
74	Marshall—H. L. J.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	1	75	2	0	0	0	0
75	Mendon—H. C. C.	4	100	3	0	0	0	0	0	0	100	5	0	0	0	0	0	0	0	0	25	5	100	1	100	2	0	0	0	0
76	Mendon—E. S.	4	25	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	1	100	2	0	0	0	0
77	Sturgis—N. I. P.	4	25	5	0	0	0	0	0	0	100	4	0	0	0	0	25	3	0	0	50	4	100	1	25	2	0	0	0	0
78	Three Rivers—C. W. B.	4	100	3	0	0	0	0	0	0	100	9	0	0	0	0	100	4	0	0	0	0	100	1	100	2	0	0	0	0
79	Union City—N. H. C.	4	100	1	0	0	0	0	0	0	75	4	0	0	50	4	0	0	0	0	0	0	100	3	0	0	0	0	0	0
80	Ypsilanti—*E. B.* *	4	0	0	0	0	0	0	0	0	25	2	0	0	0	0	0	0	0	0	25	2	100	1	0	0	0	0	0	0
81	SOUTH-EASTERN DIV.†	*44*	*96*	*4*	*0*	*0*	*25*	*6*	*30*	*8*	*100*	*5*	*0*	*0*	*50*	*8*	*91*	*7*	*63*	*12*	*85*	*9*	*100*	*2*	*88*	*4*	*88*	*11*	*92*	*9*
82	Detroit—L. C.	4	100	3	0	0	0	0	0	0	100	5	0	0	0	0	100	9	25	15	100	14	100	2	100	13	0	0	100	11
83	Detroit—*E. L.*	4	100	6	0	0	25	4	25	5	100	9	0	0	50	10	100	9	100	9	100	9	100	2	100	2	75	10	100	9
84	Detroit—W. H. R.	4	100	3	0	0	0	0	25	15	100	7	0	0	0	0	100	13	0	0	100	11	100	2	100	2	100	12	0	0
85	Milford—R. J.	4	100	3	0	0	0	0	0	0	100	4	0	0	0	0	0	0	0	0	75	5	100	1	0	0	0	0	0	0
86	Monroe—*A. J. M.*	4	0	0	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	0	0	100	1	0	0	0	0
87	Northville—J. M. S.	4	0	0	0	0	0	0	0	0	100	4	0	0	0	0	0	0	0	0	0	0	100	1	100	2	0	0	0	0
88	Pontiac—W. G. E.	4	100	3	0	0	0	0	25	8	100	9	0	0	0	0	100	7	0	0	0	0	100	1	100	4	0	0	0	0
89	Utica—G. G. R.	4	0	0	0	0	25	7	0	0	100	5	0	0	0	0	75	6	0	0	0	0	100	1	100	2	0	0	0	0
90	Washington—A. Y.	4	100	4	0	0	0	0	25	5	100	4	0	0	50	6	75	5	0	0	50	5	100	4	25	6	0	0	0	0
91	Wyandotte—E. P. C.	4	75	4	0	0	0	0	0	0	100	2	0	0	0	0	75	3	0	0	0	0	100	2	50	3	0	0	0	0
92	Wyandotte—*T. J. L.*	4	0	0	0	0	0	0	50	5	100	8	0	0	0	0	100	6	0	0	0	0	100	1	100	3	0	0	75	7

*, †, ‡, §, ||, For explanations and references, see foot-notes on pages 390-1.
No case of serious or fatal sickness has come to my knowledge during the month.—*Rev. A. W. Bill, of Menominee, on June meteorological register.*

TABLE 3.—*Diseases, by Localities in Michigan, Four Weeks ending* **June** *28, 1879*—CONTINUED.

LINE NUMBER. ¶	Influenza.		Measles.		Neuralgia.		Pneumonia.		Puerperal Fever.		Rheumatism.		Scarlatina.		Small-pox.		Tonsillitis.		Whooping-Cough.	
	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§
1	69	4.0	68	3.7	76	4.1	55	6.1	33	4.6	83	4.1	62	4.4	42	6.3	66	4.4	77	4.7
2	29	3	0	0	43	2	25	4	0	0	43	4	33	4	0	0	43	3	33	3
3	25	3	0	0	50	3	25	4	0	0	50	4	0	0	0	0	50	4	0	0
4	33	2	0	0	33	1	0	0	0	0	33	3	33	4	0	0	33	1	33	3
5	100	2	50	4	50	4	0	0	25	1	100	4	38	3	0	0	75	3	75	6
6	100	2	50	5	75	4	0	0	0	0	100	4	25	5	0	0	75	3	75	6
7	0	0	50	2	25	3	0	0	25	1	0	0	50	1	0	0	0	0	0	0
8	0	0	0	0	33	4	0	0	0	0	67	4	100	1	0	0	67	3	0	0
9	0	0	0	0	33	4	0	0	0	0	67	4	100	1	0	0	67	3	0	0
10	50	2	50	5	70	4	58	5	25	7	80	5	63	5	0	0	58	4	75	5
11	0	0	0	0	25	4	0	0	0	0	100	4	25	5	0	0	0	0	75	5
12	25	1	----	----	25	6	50	4	----	----	50	4	----	----	----	----	----	----	----	----
13	100	3	50	5	100	5	0	0	25	7	50	6	0	0	0	0	25	4	0	0
14	25	3	0	0	100	2	25	3	0	0	100	3	0	0	0	0	50	3	0	0
15	0	0	0	0	100	4	100	7	0	0	100	6	100	4	0	0	100	5	0	0
16	0	0	25	4	50	3	0	0	0	0	50	4	0	0	0	0	50	4	0	0
17	0	0	25	4	50	3	0	0	0	0	50	4	0	0	0	0	50	4	0	0
18	95	5	86	3	75	5	54	7	0	0	83	5	100	4	25	6	67	5	71	5
19	100	5	100	4	75	10	25	12	0	0	100	3	----	----	0	0	----	----	100	10
20	100	4	100	2	----	----	100	6	0	0	100	7	0	0	0	0	----	----	100	7
21	100	3	25	3	50	5	25	11	0	0	100	9	0	0	0	0	25	6	0	0
22	0	0	100	2	50	7	0	0	0	0	0	0	100	4	0	0	50	7	25	6
23	75	10	100	2	100	4	50	8	----	----	100	4	----	----	----	----	100	6	----	----
24	0	0	100	3	100	2	50	5	0	0	100	4	0	0	0	0	75	3	0	0
25	0	0	50	4	----	----	0	0	0	0	25	4	0	0	0	0	----	----	0	0
26	0	0	0	0	100	3	25	6	0	0	100	4	0	0	25	6	0	0	50	5
27	0	0	100	2	25	3	0	0	0	0	25	3	0	0	0	0	50	2	50	2
28	100	3	100	1	100	3	100	4	0	0	100	4	0	0	0	0	100	4	100	1
29	59	5	45	3	73	4	61	6	0	0	79	5	25	3	0	0	70	4	75	3
30	100	5	0	0	100	9	75	10	0	0	100	6	0	0	0	0	100	8	100	5
31	100	7	0	0	50	6	0	0	0	0	75	6	0	0	0	0	50	4	100	3
32	75	7	0	0	100	6	25	4	0	0	100	6	0	0	0	0	75	9	0	0
33	0	0	0	0	100	3	0	0	0	0	100	4	0	0	0	0	100	3	0	0
34	50	9	0	0	100	4	100	8	0	0	100	4	0	0	0	0	50	9	0	0
35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	100	3	75	5	0	0	75	6	0	0	0	0	100	3	0	0
37	50	3	0	0	25	5	0	0	0	0	50	4	0	0	0	0	0	0	0	0
38	0	0	0	0	100	2	0	0	0	0	50	3	0	0	0	0	50	2	0	0
39	0	0	100	1	0	0	0	0	0	0	0	0	0	0	0	0	----	----	0	0

	DISEASES REPORTED WHICH WERE NOT PRINTED ON THE BLANKS, AMOUNT OF SICKNESS, ETC. ¶	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§
3	Mumps	100	2
4	No case of intermittent fever originated in the Upper Peninsula.		
6	Gastric fever or ephemeral of children	25	7
9	Spasmodic croup	33	4
	Mumps	33	1
14	Quite a number of families attacked with scarlatina in our neighboring township, Laketown, which was imported from Muskegon. Few families escaped. Two deaths, June 14.		
20	All acute sickness of slight character, June 9. No acute sickness general except measles, June 14. Not much change, June 21 and 28.		
23	Dypepsia	50	5
	Spasmodic croup	25	7
	In general, public health good, June 21.		
24	Very little sickness, June 7. A larger variety of diseases, but few cases of each, June 21.		
25	Cystitis	25	4
	Cer. metritis	25	3
26	Peritonitis	50	6
27	Chicken-pox	25	3
28	See note 28 for June, page 434.		
33	Cerebral hyperæmia	100	5
	Paralysis	25	5
35	In one neighborhood there has been a mild form of ophthalmia, June 7.		
37	Little sickness, June 21.		
38	Cystitis	25	3
	Epididymitis	25	2
42	Very little sickness and that not severe, June 28.		
43	Peritonitis and enteritis, each	25	4
	Brights' disease	50	3
	Gravel	25	2
44	Intermittent fever about the same, June 7; more intermittent fever than usual; increase in temp., June 21. Slight increase in intermittent fever, June 28.		
46	Paralytic affections	50	4
	A marked increase of paralytic affections, June 14. A marked increase of malarial fever, but not widespread, June 21.		
47	Chicken-pox	25	2
	Infantile convulsions	25	3

40	50	1	25	1	75	2	----	----	----	----	50	2	----	----	----	----	25	3	----	----
41	25	5	25	4	50	5	25	4	0	0	100	5	0	0	0	0	75	5	0	0
42	----	----	50	5	100	3	75	5	----	----	100	4	----	----	----	----	100	3	----	----
43	0	0	0	0	0	0	50	3	0	0	75	4	0	0	0	0	25	4	0	0
44	0	0	0	0	25	3	0	0	0	0	0	0	0	0	0	0	75	2	0	0
45	0	0	0	0	25	3	0	0	0	0	0	0	0	0	0	0	100	2	0	0
46	0	0	0	0	100	4	0	0	0	0	100	4	0	0	0	0	75	3	0	0
47	25	1	25	4	50	3	0	0	0	0	25	5	25	3	0	0	50	2	25	2
48	*88*	*3*	*75*	*5*	*77*	*4*	*58*	*5*	*25*	*4*	*89*	*4*	*25*	*3*	*0*	*0*	*43*	*4*	*50*	*4*
49	0	0	75	5	100	2	0	0	0	0	100	3	0	0	0	0	0	0	0	0
50	100	3	----	----	100	5	75	5	----	----	100	5	----	----	----	----	50	4	----	----
51	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
52	0	0	0	0	100	2	0	0	0	0	100	1	0	0	0	0	33	4	----	----
53	0	0	0	0	50	2	0	0	0	0	25	3	25	3	0	0	0	0	0	0
54	75	3	0	0	100	7	25	7	0	0	100	7	0	0	0	0	100	4	0	0
55	0	0	0	0	50	5	0	0	0	0	100	5	0	0	0	0	25	4	75	3
56	0	0	0	0	75	3	0	0	25	4	100	3	0	0	0	0	----	----	0	0
57	0	0	0	0	50	4	75	3	0	0	75	3	0	0	0	0	25	3	25	4
58	0	0	0	0	0	0	0	0	0	0	100	2	0	0	0	0	25	2	----	----
59	*65*	*4*	*75*	*5*	*85*	*4*	*40*	*7*	*50*	*6*	*84*	*4*	*68*	*4*	*50*	*7*	*68*	*5*	*100*	*5*
60	0	0	0	0	50	3	0	0	0	0	75	2	0	0	0	0	100	4	0	0
61	100	2	50	5	100	4	100	9	0	0	100	6	0	0	0	0	50	6	0	0
62	25	3	----	----	----	----	25	5	25	6	75	6	25	7	50	7	25	8	----	----
63	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0
64	50	3	0	0	100	3	0	0	100	5	100	3	0	0	0	0	50	4	0	0
65	0	0	0	0	100	4	0	0	0	0	100	2	0	0	0	0	50	4	0	0
66	0	0	0	0	100	5	25	11	0	0	100	2	25	10	0	0	75	9	100	7
67	0	0	0	0	100	2	0	0	0	0	100	3	0	0	0	0	0	0	0	0
68	100	3	0	0	0	0	50	4	0	0	100	3	0	0	0	0	0	0	0	0
69	----	----	----	----	----	----	----	----	----	----	100	3	----	----	----	----	100	5	----	----
70	100	2	0	0	100	2	0	0	0	0	100	2	100	2	0	0	50	3	0	0
71	25	5	100	4	0	0	25	8	0	0	100	6	100	4	0	0	50	7	100	5
72	50	5	0	0	0	0	0	0	0	0	0	0	100	4	0	0	100	3	0	0
73	0	0	0	0	0	0	0	0	0	0	33	1	67	2	0	0	0	0	0	0
74	0	0	0	0	25	4	0	0	0	0	75	3	0	0	0	0	----	----	0	0
75	0	0	0	0	100	4	25	4	0	0	100	4	0	0	0	0	0	0	0	0
76	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	50	4	0	0
77	0	0	0	0	75	4	50	5	0	0	50	4	0	0	0	0	0	0	100	3
78	100	5	0	0	100	6	25	8	0	0	100	7	0	0	0	0	0	0	100	7
79	0	0	0	0	75	5	0	0	0	0	25	6	0	0	0	0	100	2	100	1
80	0	0	0	0	0	0	0	0	0	0	0	0	75	2	0	0	0	0	0	0
81	*75*	*5*	*75*	*5*	*96*	*5*	*64*	*6*	*0*	*0*	*91*	*4*	*68*	*6*	*50*	*6*	*90*	*6*	*100*	*8*
82	25	12	100	9	100	4	100	12	0	0	100	2	100	7	0	0	100	8	100	8
83	100	2	100	3	100	4	100	8	0	0	100	7	100	5	0	0	100	10	0	0
84	100	4	75	8	100	11	100	6	0	0	100	9	25	15	0	0	100	6	0	0
85	100	3	0	0	0	0	0	0	0	0	50	5	0	0	0	0	0	0	0	0
86	0	0	0	0	100	4	100	2	0	0	100	5	25	6	50	6	0	0	0	0
87	0	0	0	0	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0
88	100	2	0	0	100	7	75	6	0	0	100	5	0	0	0	0	0	0	0	0
89	0	0	0	0	75	4	25	5	0	0	100	4	25	3	0	0	0	0	0	0
90	25	5	75	4	100	4	25	5	0	0	100	1	0	0	0	0	100	5	0	0
91	0	0	25	3	0	0	25	3	----	----	50	3	100	2	0	0	50	3	0	0
92	0	0	0	0	----	----	25	6	0	0	100	4	100	2	0	0	----	----	0	0

51	Epilepsy	25	3
	Sickness very light week ending June 7. Very healthy, dry and warm, June 21.		
52	Cystitis	67	3
	Chorea	33	3
	Atrophy of heart	33	3
	Less sickness than ever known in this part of Mich.		
53	Increase in intermittent fever June 26.		
54	Mumps	25	9
55	Carcinoma	75	8
	Scrofula	75	8
	Mumps	25	11
57	Metritis, hepatitis, orchitis, epilepsy, synovitis, cancer uteri, locomotor ataxy, spinal irritation, and hemiplegia, each	25	3
	Dyspepsia, cystitis, and heart disease, each	75	3
	Bilious colic	50	4
	Uterine hemorrhage	25	4
	Hæmatemesis	25	3
	The heart disease is probably ossification of the mitral valves, producing congestion of the lungs.		
61	Very little sickness, June 21.		
62	One case of small-pox, a tramp from Canada.		
66	Pharyngitis	100	5
69	Syphilis	100	6
71	General systemic disorders	25	1
	See note 71 for June, page 434.		
75	Splenitis	25	4
78	Catarrh	50	8
	Asthma	50	10
	Purpura hemorrhagica	50	10
	Continues healthy, four weeks ending June 28.		
80	General health very good, June 14. Very little illness, June 21.		
83	Mumps	100	9
84	Mumps	50	10
	Convulsions	25	11
	Very healthy, 4 weeks ending June 28. Measles of a mild type quite common, June 28.		
87	Consumption, marked "phthisis florida or very like it," June 7. Not much sickness, June 21. Almost no sickness except from chronic causes, such as dropsy, age or heart diseases and rheumatism, June 28.		
90	Dyspepsia	100	2
	Malaria	75	4
	Scrofulosis	50	4
	Peritonitis	25	4
91	Mumps	25	1
	Urticaria	50	3
	The first cases of measles for several years, week ending June 21.		
92	Two deaths from scarlatina (malig. anginosa), week ending June 28.		

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‡, § For explanations and references, see pages 390-1.

¶ The several numbered lines on these two pages continue statements for the localities and divisions which are named and have the same line-numbers on the two preceding pages. On the right side of the page the numbers before the side-notes are the line-numbers of the localities on pages 406-7, to which the side-notes refer.

TABLE 3.—CONTINUED.—*Diseases, by Localities in Michigan, Five Weeks ending* **August** *2, 1879.*

LINE NUMBER.	DIVISIONS AND LOCALITIES REPRESENTED. AND INITIALS OF PHYSICIANS WHO REPORTED.* (Health Officers in italics; those also Correspondents marked with a *.)	Reports Received.	Bowels, Inflam-mat'n of.		Bron-chitis.		Cerebro-Spinal Men'gitis.		Cholera Infant-um.		Cholera Morbus.		Consump-tion, Pul-monary.		Croup, Membra-neous.		Diph-theria.		Diarrhea.		Dysen-tery.		Erysip-elas.		Fever, Intermit-tent.		Fever, Remit-tent.		Fever, Typhoid (Enteric).	
			Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§
1	ALL LOCALITIES‖	395	----	----	72	5.0	40	7.5	62	4.8	61	4.6	90	5.6	20	4.0	48	5.1	80	3.1	51	5.4	49	6.4	97	1.5	87	3.0	40	8.2
2	UPPER PENIN. DIV.†	*9*	----	----	*50*	*2*	*0*	*0*	*44*	*3*	*56*	*2*	*100*	*3*	*0*	*0*	*0*	*0*	*78*	*3*	*33*	*3*	*56*	*4*	*0*	*0*	*0*	*0*	*20*	*3*
3	Houghton—H. W. J.	5	----	----	0	0	0	0	60	3	80	3	100	2	0	0	0	0	60	3	40	3	60	4	0	0	0	0	20	3
4	Ishpeming—*W. T. C.**.	4	----	----	50	2	0	0	25	3	25	1	100	4	0	0	0	0	100	2	25	3	50	4	0	0	0	0	0	0
5	NORTH-WESTERN DIV.†	*10*	----	----	*60*	*3*	*0*	*0*	*70*	*2*	*60*	*3*	*0*	*0*	*0*	*0*	*20*	*2*	*90*	*2*	*40*	*4*	*20*	*3*	*40*	*3*	*0*	*0*	*20*	*5*
6	Cadillac—C. E. M.	5	20	6	60	3	0	0	60	3	60	3	0	0	0	0	0	0	100	1	40	4	0	0	40	2	0	0	20	5
7	Cadillac—*J. M. W.*	5	----	----	0	0	0	0	80	1	0	0	0	0	0	0	20	2	80	2	0	0	20	3	40	3	0	0	0	0
8	NORTH-EASTERN DIV.†	*5*	----	----	*80*	*4*	*0*	*0*	*100*	*1*	*80*	*3*	*0*	*0*	*0*	*0*	*0*	*0*	*100*	*2*	*60*	*4*	*40*	*4*	*80*	*5*	*80*	*4*	*0*	*0*
9	Alpena—W. P. M.	5	----	----	80	4	0	0	100	1	80	3	0	0	0	0	0	0	100	2	60	4	40	4	80	5	80	4	0	0
10	WESTERN DIV.†	*25*	----	----	*100*	*11*	*40*	*6*	*67*	*8*	*73*	7	*100*	*9*	*0*	*0*	*60*	*9*	*76*	*4*	*56*	*4*	*70*	7	*96*	*1*	*100*	*2*	*20*	*13*
11	Cedar Springs—C. S. F.	5	----	----	0	0	40	6	0	0	0	0	0	0	0	0	0	0	40	5	20	3	80	5	100	1	100	2	0	0
12	Grand Haven—*A. V.*	5	----	----	0	0	0	0	80	5	80	5	0	0	0	0	0	0	100	3	80	4	20	7	100	1	100	2	0	0
13	Grand Rapids—A. H.	5	20	8	0	0	0	0	60	6	40	8	100	5	0	0	100	7	100	4	40	7	0	0	100	2	100	2	0	0
14	Holland—*B. L.*	5	----	----	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	2	40	3	100	3	80	2	100	1	0	0
15	Muskegon—*O. C. W.*	5	----	----	100	11	0	0	60	12	100	7	100	13	0	0	20	11	100	4	100	5	80	11	100	1	100	2	20	13
16	NORTH'N-CENT'L DIV.†	*5*	----	----	*0*	*0*	*0*	*0*	*0*	*0*	*40*	*3*	*60*	*4*	*0*	*0*	*20*	*4*	*20*	*3*	*80*	*2*	*20*	*5*	*100*	*1*	*40*	*5*	*0*	*0*
17	Big Rapids—*I. W. B.*	5	----	----	0	0	0	0	0	0	40	3	60	4	0	0	20	4	20	3	80	2	20	5	100	1	40	5	0	0
18	BAY AND EAST'N DIV.†	*49*	----	----	*90*	*5*	*60*	*4*	*76*	*5*	*70*	*5*	*98*	*6*	*0*	*0*	*61*	*7*	*92*	*2*	*59*	*6*	*60*	*7*	*100*	*1*	*89*	*4*	*20*	*9*
19	Bay City—W. H. B.	5	----	----	100	9	0	0	100	5	100	7	100	9	0	0	60	12	100	2	80	10	0	0	100	1	100	5	0	0
20	Bay City—W. R. M.	5	----	----	100	4	0	0	20	6	60	4	100	5	0	0	20	7	100	3	40	5	20	7	100	1	100	6	0	0
21	Lapeer—*H. McC.*	3	----	----	----	----	----	----	67	3	67	4	----	----	----	----	----	----	100	2	----	----	----	----	100	1	67	3	----	----
22	Lapeer—A. N.	3	----	----	0	0	0	0	67	10	100	6	100	11	0	0	67	5	100	1	33	10	0	0	100	2	100	6	0	0
23	Port Huron—*E. P. T.*	3	----	----	0	0	0	0	100	3	33	3	0	0	0	0	0	0	100	1	67	6	----	----	100	2	100	5	0	0
24	Port Huron—A. A. W.	5	----	----	100	3	0	0	0	0	80	5	80	7	0	0	0	0	80	5	60	5	0	0	100	1	100	3	0	0
25	Saginaw City—*E. A. H.*	5	----	----	80	8	----	----	80	4	60	4	100	8	0	0	80	6	100	2	80	7	40	9	100	2	80	5	20	9
26	Saginaw City—N. D. L.	5	----	----	100	5	0	0	80	4	80	6	100	5	0	0	100	5	100	2	80	5	100	6	100	1	80	6	0	0
27	St. Clair—*C. G. R.*	5	----	----	60	3	60	4	0	0	0	0	100	3	0	0	0	0	40	3	40	3	0	0	100	2	60	2	0	0
28	Thornville—J. S. C.	5	----	----	100	4	0	0	0	0	20	6	100	6	0	0	0	0	100	2	0	0	0	0	100	1	0	0	0	0
29	W. Bay City—*I. E. R.**	5	----	----	80	7	0	0	100	4	100	3	100	4	0	0	40	5	100	3	40	5	80	6	100	1	100	2	0	0
30	CENTRAL DIVISION†	*92*	----	----	*67*	*6*	*20*	*10*	*63*	*5*	*54*	*5*	*80*	*5*	*0*	*0*	*40*	*5*	*80*	*3*	*43*	*5*	*44*	7	*98*	*1*	*90*	*3*	*20*	*3*
31	Charlotte—G. B. A.	5	----	----	100	5	0	0	100	6	80	8	80	14	0	0	60	12	100	2	0	0	20	13	100	1	100	6	0	0
32	Charlotte—*P. D. P.*	5	----	----	100	6	0	0	80	7	60	5	80	9	0	0	0	0	100	3	60	5	40	11	100	1	100	2	0	0
33	Corunna—*A. G. B.*	5	----	----	20	11	0	0	40	8	40	7	100	6	0	0	100	4	100	3	20	9	80	7	100	1	100	2	20	3
34	DeWitt—G. W. T.	5	----	----	100	3	0	0	0	0	0	0	100	5	0	0	20	5	60	3	0	0	0	0	100	1	100	2	0	0
35	Elsie—E. V. C.	5	----	----	0	0	0	0	40	4	60	3	0	0	0	0	0	0	40	4	0	0	20	4	100	1	100	2	0	0
36	Greenville—*J. M.*	5	----	----	100	9	20	10	100	7	100	8	100	6	0	0	0	0	100	6	100	8	80	8	100	1	100	2	0	0
37	Hastings—A. P. D.	5	----	----	0	0	0	0	0	0	20	2	100	3	0	0	0	0	0	0	0	0	0	0	100	1	60	3	0	0
38	Hubbardston—H. W. B.	5	20	7	0	0	0	0	20	6	20	7	100	8	0	0	0	0	80	6	0	0	20	6	100	1	100	2	0	0
39	Ionia, H. of C.—W. F. R.	5	40	4	20	3	0	0	0	0	20	4	0	0	0	0	0	0	80	2	0	0	20	4	100	2	100	2	0	0

40	Ionia—*S. V. R.*	5	----	----	0	0	0	0	0	0	20	5	100	4	0	0	0	0	60	3	0	0	0	0	100	1	100	2	0	0
41	Ithaca—I. N. M.	5	----	----	0	0	0	0	20	3	0	0	20	3	0	0	0	0	40	2	0	0	0	0	60	2	0	0	0	0
42	Lansing—*J. H. W.*	5	----	----	100	5	0	0	100	3	100	3	100	5	0	0	0	0	100	3	0	0	0	0	100	1	100	1	0	0
43	Mason—*W. W. R.*	4	25	5	100	5	----	----	75	5	100	5	50	4	----	----	----	----	100	2	50	5	100	5	100	1	100	5	----	----
44	Muir—L. S. S.	3	0	0	0	0	0	0	0	0	0	0	67	6	0	0	0	0	100	4	33	4	0	0	100	1	33	3	0	0
45	North Lansing—O. M.	5	20	3	0	0	0	0	0	0	40	3	100	2	0	0	40	3	60	3	40	4	20	3	100	1	80	3	0	0
46	Otisville—A. W. N.	5	----	----	20	4	0	0	0	0	40	4	100	3	0	0	0	0	100	2	20	4	80	5	100	1	0	0	0	0
47	Ovid—O. B. C.	5	----	----	----	----	----	----	40	4	60	2	40	4	----	----	20	3	40	3	20	3	----	----	----	----	100	2	----	----
48	Vernon—D. C. H.	5	----	----	0	0	0	0	80	2	80	2	100	6	0	0	20	5	100	2	0	0	20	6	100	1	100	2	0	0
49	Webberville—R. B. S	5	----	----	20	4	0	0	0	0	40	4	20	5	0	0	20	3	100	3	40	5	0	0	100	1	40	5	0	0
50	SOUTH-WESTERN DIV.†	*51*	----	----	*61*	*5*	*0*	*0*	*27*	*4*	*46*	*4*	*90*	*5*	*20*	*4*	*65*	*3*	*75*	*3*	*75*	*4*	*44*	*5*	*98*	*2*	*76*	*3*	*0*	*0*
51	Allegan—H.S.L.&W.H.B.	5	----	----	40	7	0	0	0	0	60	6	100	6	0	0	0	0	60	4	0	0	20	5	100	1	100	3	0	0
52	Cassopolis—F. G.	5	----	----	40	5	----	----	20	5	100	3	----	----	----	----	80	4	100	2	----	----	----	----	100	1	----	----	----	----
53	Dayton—W. A. N.	3	0	0	33	5	0	0	0	0	67	5	33	6	0	0	67	5	100	2	33	4	100	4	100	1	100	2	0	0
54	Dowagiac—*E. C. P.*	5	----	----	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	2	0	0	0	0	100	1	40	2	0	0
55	Mattawan—T. H. B.	3	----	----	0	0	0	0	0	0	33	6	67	5	0	0	0	0	67	4	0	0	67	3	67	5	0	0	0	0
56	New Troy—G. H. R.	5	----	----	0	0	0	0	20	4	20	2	0	0	0	0	80	2	80	2	0	0	0	0	100	2	0	0	0	0
57	Niles—J. S. R.	5	----	----	100	4	0	0	0	0	20	6	100	5	0	0	0	0	80	7	0	0	20	9	100	3	40	2	0	0
58	Niles—*I. S.*	5	----	----	100	7	0	0	0	0	40	3	100	7	0	0	0	0	100	5	0	0	0	0	100	2	80	7	0	0
59	Otsego—M. C.	5	----	----	0	0	0	0	0	0	20	7	100	4	0	0	80	3	40	3	0	0	0	0	100	1	60	4	0	0
60	Paw Paw—J. A.	5	----	----	40	4	0	0	0	0	20	3	100	3	20	4	0	0	80	3	0	0	0	0	100	2	100	1	0	0
61	St. Joseph—R. F. S.	5	----	----	0	0	0	0	40	3	80	3	0	0	0	0	20	3	100	3	100	3	0	0	100	1	100	2	0	0
62	SOUTH'N-CENTRAL DIV.†	*90*	----	----	*64*	*4*	*40*	*10*	*57*	*5*	*62*	*5*	*87*	*5*	*0*	*0*	*40*	*5*	*75*	*3*	*42*	*6*	*49*	*6*	*99*	*2*	*80*	*3*	*40*	*9*
63	Adrian—*A. M. S.*	5	----	----	60	4	0	0	0	0	80	4	100	3	0	0	40	3	40	2	0	0	0	0	100	1	20	6	0	0
64	Albion—J. P. S.	5	----	----	60	8	0	0	0	0	100	8	100	8	0	0	0	0	100	5	100	6	100	8	100	1	100	2	0	0
65	Battle Creek—*S. S. F.**	5	----	----	----	----	----	----	40	5	80	5	----	----	----	----	----	----	60	3	----	----	60	6	100	1	100	2	40	8
66	Brooklyn—E. N. P.	5	----	----	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	2	20	4	0	0	100	1	40	3	0	0
67	Centreville—M. S.	5	----	----	60	5	0	0	0	0	40	4	40	5	0	0	0	0	80	4	40	4	40	6	100	1	100	2	0	0
68	Clinton—A. W. A.	5	40	9	0	0	40	10	20	9	80	5	100	7	0	0	60	7	100	3	40	8	20	7	100	1	100	3	0	0
69	Coldwater—*G. V. V.*	5	----	----	----	----	0	0	0	0	60	4	100	6	0	0	20	6	100	2	0	0	0	0	100	1	0	0	0	0
70	Hillsdale—*J. W. F.**	5	----	----	20	4	----	----	0	0	0	0	80	3	0	0	40	3	100	3	0	0	80	3	100	2	80	3	0	0
71	Jackson (Prison), E. L. K.	5	----	----	100	1	----	----	----	----	----	----	100	4	----	----	----	----	100	5	80	7	----	----	80	3	20	3	40	9
72	Jackson—W. W.	5	----	----	0	0	0	0	100	3	80	3	100	4	0	0	20	8	100	2	20	7	0	0	100	5	100	3	0	0
73	Kalamazoo—W. B. S.	5	----	----	0	0	0	0	100	4	60	5	100	6	0	0	0	0	60	3	20	6	0	0	100	1	100	2	0	0
74	Marshall—H. L. J.	5	----	----	20	3	0	0	0	0	0	0	0	0	0	0	0	0	60	2	0	0	0	0	100	1	0	0	0	0
75	Mendon—H. C. C.	5	----	----	100	3	0	0	0	0	20	5	100	5	0	0	0	0	20	6	20	6	20	6	100	1	100	2	0	0
76	Mendon—E. S.	5	----	----	20	3	----	----	20	5	40	4	40	5	0	0	0	0	40	3	40	1	0	0	100	2	100	2	0	0
77	Sturgis—N. I. P.	5	----	----	0	0	0	0	80	4	80	4	80	5	0	0	0	0	100	3	0	0	20	5	100	1	60	2	0	0
78	Three Rivers—C. W. B.	5	----	----	100	4	0	0	0	0	60	7	100	10	0	0	0	0	100	4	0	0	0	0	100	1	100	2	0	0
79	Union City—N. H. C.	5	----	----	100	3	0	0	0	0	20	6	0	0	0	0	60	3	100	5	40	6	0	0	100	4	0	0	0	0
80	Ypsilanti—*E. B.**	5	----	----	----	----	0	0	40	2	0	0	80	2	0	0	0	0	0	0	0	0	0	0	100	1	0	0	0	0
81	SOUTH-EASTERN DIV.†	*59*	----	----	*77*	*5*	*0*	*0*	*64*	*6*	*78*	*5*	*98*	*6*	*0*	*0*	*47*	*4*	*85*	*3*	*59*	*8*	*49*	*8*	*98*	*2*	*98*	*3*	*73*	*11*
82	Detroit—L. C.	5	----	----	100	5	0	0	80	4	80	3	100	7	0	0	0	0	100	2	80	10	100	15	100	2	100	10	20	6
83	Detroit—*E. L*	5	----	----	100	7	0	0	100	2	100	4	100	9	0	0	0	0	100	4	100	5	80	10	100	3	100	3	100	10
84	Detroit—W. H. R.	5	----	----	100	8	0	0	60	14	80	10	100	7	0	0	0	0	100	3	80	16	100	16	100	2	100	3	100	16
85	Milford—R. J.	5	----	----	100	3	0	0	0	0	20	3	80	5	0	0	0	0	40	3	0	0	0	0	100	1	0	0	0	0
86	Monroe—*A. J. M.*	5	----	----	0	0	0	0	20	4	0	0	100	7	0	0	0	0	60	4	0	0	20	5	100	1	100	2	0	0
87	Northville—J. M. S.	5	----	----	20	5	----	----	----	----	----	----	100	4	----	----	60	4	----	----	----	----	60	4	100	2	100	1	----	----
88	Pontiac—W. G. E.	5	----	----	20	6	0	0	20	8	100	3	100	8	0	0	0	0	100	2	0	0	0	0	100	1	100	4	0	0
89	Trenton—W. C.	4	0	0	0	0	0	0	100	4	75	3	0	0	0	0	0	0	75	6	25	7	0	0	100	1	100	2	0	0
90	Utica—G. G. R.	5	----	----	0	0	0	0	80	5	100	4	100	5	0	0	0	0	100	2	0	0	20	6	80	1	100	3	0	0
91	Washington—A. Y.	5	----	----	100	2	----	----	0	0	60	4	100	3	0	0	0	0	80	4	40	5	20	5	100	4	0	0	0	0
92	Wyandotte—E. P. C.	5	----	----	0	0	0	0	40	4	80	3	100	3	0	0	20	3	80	2	20	2	20	3	100	1	80	2	0	0
93	Wyandotte—*T. J. L.*	5	----	----	0	0	0	0	80	5	80	8	100	8	0	0	60	4	100	4	0	0	20	10	100	1	100	3	0	0

A remarkably pleasant and healthy month. There is scarcely any sickness in this village. The only deaths I know of are very young children, and are from constitutional causes, except one case of drowning, a sailor.—*A. W. Bill, of Menominee, on July Meteorological Register.*

*, †, ‡, §, ‖, For explanations and references, see foot-notes on pages 390–1.

TABLE 3.—*Diseases, by Localities in Michigan, Five Weeks ending* **August** *2, 1879*—CONTINUED.

LINE NUMBER. ¶	Fever, Typho-Malarial		Influenza.		Measles.		Neuralgia.		Pneumonia.		Puerperal Fever.		Rheumatism.		Scarlatina.		Small-pox.		Tonsillitis.		Whooping-Cough.	
	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§
1	56	6.3	65	5.2	60	4.4	69	5.0	47	6.3	29	5.1	81	5.0	59	5.6	44	6.0	58	5.3	60	5.8
2	*0*	*0*	*0*	*0*	*0*	*0*	*33*	*4*	*56*	*4*	*0*	*0*	*44*	*4*	*25*	*4*	*0*	*0*	*0*	*0*	*0*	*0*
3	0	0	0	0	0	0	20	4	80	4	0	0	20	6	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	50	3	25	4	0	0	75	2	25	4	0	0	0	0	0	0
5	*20*	*2*	*40*	*3*	*20*	*2*	*20*	*4*	*20*	*4*	*20*	*3*	*100*	*3*	*20*	*3*	*0*	*0*	*20*	*4*	*20*	*5*
6	0	0	40	3	0	0	20	5	0	0	0	0	100	3	0	0	0	0	20	4	20	5
7	20	2	0	0	20	2	20	2	20	4	20	3	0	0	20	3	0	0	0	0	0	0
8	*0*	*0*	*0*	*0*	*0*	*0*	*80*	*5*	*0*	*0*	*0*	*0*	*80*	*4*	*100*	*2*	*0*	*0*	*100*	*3*	*0*	*0*
9	0	0	0	0	0	0	80	5	0	0	0	0	80	4	100	2	0	0	100	3	0	0
10	*80*	*7*	*73*	*5*	*80*	*5*	*60*	*5*	*30*	*6*	*0*	*0*	*80*	*6*	*20*	*7*	*0*	*0*	*73*	6	*50*	*9*
11	60	3	0	0	0	0	20	7	20	6	0	0	100	6	20	7	0	0	0	0	100	4
12	0	0	0	0	0	0	0	0	40	6	0	0	0	0	20	7	0	0	20	8	0	0
13	0	0	100	3	80	5	80	6	0	0	0	0	20	5	0	0	0	0	100	4	0	0
14	0	0	20	3	0	0	40	3	0	0	0	0	100	3	0	0	0	0	0	0	0	0
15	100	10	100	8	0	0	100	4	0	0	0	0	100	11	0	0	0	0	100	6	100	14
16	*20*	*3*	*0*	*0*	*0*	*0*	*40*	*4*	*0*	*0*	*0*	*0*	*60*	*4*	*0*	*0*	*0*	*0*	*20*	*3*	*0*	*0*
17	20	3	0	0	0	0	40	4	0	0	0	0	60	4	0	0	0	0	20	3	0	0
18	*54*	*7*	*100*	*5*	*66*	*4*	*61*	*6*	*48*	*6*	*0*	*0*	*80*	*6*	*62*	*4*	*60*	*6*	*64*	*6*	*68*	*7*
19	100	12	100	7	100	8	20	10	0	0	0	0	100	3	0	0	0	0	----	----	100	12
20	20	7	100	5	80	3	----	----	100	7	0	0	100	7	0	0	0	0	----	----	80	7
21	----	----	----	----	----	----	----	----	----	----	----	----	33	5	67	4	----	----	----	----	67	5
22	100	4	100	3	0	0	33	8	0	0	0	0	100	10	0	0	0	0	0	0	0	0
23	0	0	0	0	0	0	33	6	0	0	0	0	67	6	0	0	0	0	----	----	0	0
24	40	5	0	0	40	5	20	8	40	7	0	0	0	0	40	6	0	0	20	6	0	0
25	60	8	----	----	100	4	100	5	----	----	----	----	60	7	----	----	----	----	80	8	40	8
26	0	0	0	0	20	2	100	3	20	5	0	0	100	4	0	0	0	0	100	5	20	6
27	0	0	0	0	0	0	20	5	0	0	0	0	20	5	80	2	0	0	----	----	0	0
28	0	0	0	0	20	6	100	4	20	6	0	0	100	5	0	0	60	6	20	6	0	0
29	20	4	0	0	100	3	100	4	60	4	0	0	100	5	0	0	0	0	100	4	100	2
30	*50*	*5*	*50*	*5*	*64*	*3*	*81*	*5*	*41*	*7*	*40*	*3*	*84*	*5*	*60*	*4*	*25*	*6*	*59*	*6*	*57*	*4*
31	60	10	100	5	0	0	100	11	100	11	0	0	80	10	0	0	0	0	100	9	100	4
32	0	0	100	7	0	0	100	7	40	9	0	0	100	9	0	0	0	0	20	12	60	9
33	40	7	40	8	0	0	100	7	20	7	0	0	100	8	0	0	0	0	0	0	0	0
34	0	0	0	0	0	0	100	3	0	0	0	0	100	4	0	0	0	0	100	4	20	4
35	0	0	0	0	0	0	0	0	40	5	0	0	0	0	0	0	0	0	20	3	0	0
36	100	5	40	9	0	0	100	6	60	9	0	0	100	6	0	0	0	0	40	9	0	0
37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	2
38	0	0	20	3	0	0	80	4	0	0	0	0	100	4	----	----	----	----	----	----	40	8
39	0	0	0	0	0	0	100	2	0	0	0	0	20	2	0	0	0	0	40	4	0	0
40	0	0	0	0	80	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41	40	3	20	2	60	2	100	2	20	4	60	3	100	2	0	0	0	0	0	0	0	0

Line	DISEASES REPORTED WHICH WERE NOT PRINTED ON THE BLANKS, AMOUNT OF SICKNESS, ETC. ¶	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§
3	Mumps	100	1
	Diabetes mel.	60	5
4	Enteritis	25	4
6	Infantile paralysis	40	5
	False croup	20	4
9	Puerperal eclampsia	20	6
	Infantile convulsions	40	5
	Polypus ear and perityphlitis, each	20	5
	Conjunctivitis	20	4
	Endometritis	20	3
14	Bilious fever	20	2
20	The usual summer sickness; nothing severe, 2 weeks ending July 19.		
23	Hepatic abscess	33	....
25	Meningitis	20	10
	Dyspepsia	80	5
	Puerperal mania	20	9
26	See note 26 for July, on page 434.		
34	Anæmia	60	4
	Dropsy	40	5
	Colic	20	5
	Amenorrhea	20	5
	Oedema	20	5
37	But little sickness, 3 weeks ending July 19. A little increase of malarial diseases, July 26.		
38	Ophthalmia	40	5
	Pharyngitis	60	6
	Catarrh	20	3
39	Dyspepsia	20	3
44	The cases of rheumatism have cardiac complications, July 19. The intermittents have a tendency to run into continued fever, July 26.		
45	Bright's disease	20	2
	Pleurisy	20	3
	Indigestion	20	2
46	Pharyngitis	40	1
	Less general sickness, July 5. Increase of intermittent fever, July 19 and 26. More diarrhœa and intermittent fever, Aug. 3.		
48	Very little sickness, July 5. Phlegmonous erysipelas and pneumonia, one case each, fatal.		

42	40	3	0	0	0	0	40	7	0	0	0	0	100	6	40	4	0	0	0	0	0	0
43	25	6	75	5	50	3	100	4	50	5	----	----	100	3	----	----	25	6	75	4	75	4
44	33	4	33	4	0	0	33	5	0	0	0	0	100	4	0	0	0	0	0	0	100	3
45	0	0	0	0	0	0	0	0	0	0	20	3	40	3	0	0	0	0	60	3	0	0
46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80	4	0	0	60	3	0	0
47	----	----	----	----	----	----	40	1	----	----	----	----	----	----	----	----	----	----	----	----	20	4
48	0	0	0	0	----	----	100	4	20	7	0	0	100	5	----	----	----	----	----	----	20	3
49	0	0	20	5	0	0	20	4	20	5	0	0	40	5	60	4	0	0	80	5	100	1
50	*80*	*3*	*50*	*5*	*40*	*7*	*86*	*4*	*27*	*4*	*20*	*7*	*78*	*4*	*27*	*7*	*0*	*0*	*48*	*4*	*70*	*6*
51	0	0	0	0	40	7	100	3	0	0	0	0	80	5	0	0	0	0	0	0	0	0
52	----	----	60	4	----	----	80	5	----	----	----	----	100	4	----	----	----	----	----	----	----	----
53	0	0	0	0	0	0	100	4	0	0	0	0	100	5	0	0	0	0	100	4	0	0
54	0	0	0	0	0	0	0	0	20	3	0	0	0	0	0	0	0	0	0	0	0	0
55	0	0	0	0	0	0	100	2	0	0	0	0	100	2	----	----	----	----	----	----	----	----
56	0	0	0	0	0	0	0	0	0	0	0	0	20	3	0	0	0	0	20	2	0	0
57	0	0	20	7	0	0	100	3	20	7	0	0	100	4	20	8	0	0	40	5	40	9
58	0	0	0	0	0	0	100	8	0	0	20	7	100	7	20	11	0	0	0	0	100	2
59	0	0	40	4	0	0	20	4	0	0	0	0	60	4	40	3	0	0	80	4	0	0
60	80	3	0	0	0	0	100	3	40	3	0	0	60	3	0	0	0	0	20	3	0	0
61	0	0	80	4	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0
62	*47*	*8*	*75*	*5*	*30*	*4*	*56*	*5*	*50*	*6*	*30*	*8*	*79*	*5*	*50*	*6*	*0*	*0*	*57*	*5*	*70*	*5*
63	0	0	0	0	0	0	40	5	0	0	0	0	80	2	0	0	0	0	40	3	0	0
64	20	11	80	5	0	0	100	6	80	6	0	0	100	7	0	0	0	0	0	0	0	0
65	20	5	----	----	----	----	60	6	20	7	20	7	60	5	----	----	----	----	----	----	----	----
66	0	0	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0
67	0	0	80	4	0	0	100	4	0	0	0	0	100	4	0	0	0	0	60	5	0	0
68	100	7	0	0	0	0	60	5	0	0	0	0	60	3	0	0	0	0	0	0	0	0
69	0	0	0	0	0	0	100	3	0	0	0	0	100	4	0	0	0	0	0	0	0	0
70	----	----	40	4	40	1	40	4	20	1	----	----	100	2	0	0	0	0	----	----	0	0
71	----	----	----	----	----	----	----	----	80	9	----	----	100	3	----	----	----	----	100	6	----	----
72	0	0	0	0	20	7	0	0	0	0	0	0	60	7	80	7	0	0	0	0	40	8
73	0	0	0	0	0	0	0	0	0	0	40	8	0	0	20	4	0	0	0	0	0	0
74	0	0	0	0	0	0	20	3	0	0	0	0	100	2	0	0	0	0	----	----	0	0
75	0	0	0	0	0	0	80	4	0	0	0	0	100	4	0	0	0	0	0	0	0	0
76	0	0	0	0	0	0	40	4	0	0	0	0	20	4	0	0	0	0	0	0	0	0
77	0	0	0	0	0	0	40	6	0	0	0	0	0	0	0	0	0	0	20	6	40	4
78	0	0	100	5	0	0	60	6	0	0	0	0	100	8	0	0	0	0	----	----	100	6
79	0	0	0	0	0	0	20	7	0	0	0	0	20	8	0	0	0	0	100	3	100	1
80	0	0	0	0	0	0	20	3	0	0	0	0	0	0	0	0	0	0	20	4	0	0
81	*80*	*12*	*76*	*7*	*67*	*5*	*97*	*7*	*73*	*8*	*20*	*5*	*92*	*6*	*87*	*7*	*0*	*0*	*59*	*7*	*60*	*11*
82	100	15	60	15	100	11	100	8	100	12	0	9	100	6	100	9	0	0	100	14	100	14
83	100	9	100	6	100	2	100	5	100	9	0	0	100	7	100	5	0	0	80	10	20	8
84	0	0	100	5	100	3	100	12	100	10	0	0	100	12	100	15	0	0	100	5	0	0
85	0	0	80	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	5	0	0
86	0	0	0	0	0	0	80	6	100	4	20	5	100	7	100	7	0	0	0	0	0	0
87	----	----	----	----	20	5	----	----	----	----	----	----	80	4	----	----	----	----	----	----	----	----
88	0	0	40	6	0	0	100	6	0	0	0	0	100	6	40	7	0	0	0	0	0	0
89	0	0	0	0	0	0	100	6	0	0	0	0	100	6	100	4	0	0	50	5	0	0
90	0	0	0	0	60	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
91	0	0	0	0	0	0	100	3	20	5	0	0	100	1	0	0	0	0	40	5	0	0
92	0	0	0	0	0	0	----	----	0	0	0	0	40	4	60	3	0	0	20	4	0	0
93	40	6	0	0	20	7	----	----	20	10	0	0	100	7	100	4	0	0	----	----	0	0

53	Heart disease	100	5
	Very healthy, July 19.		
55	Cystitis	33	5
	Acute nephritis	33	7
	Peritonitis	33	6
56	Gastralgia	40	3
	Tonsilitis probably of diphtheritic origin.		
58	Mumps	100	3
60	Dyspepsia	60	3
	Locomotor ataxy	100	3
	Epilepsy and cystitis, each	40	4
	Spinal irritation	60	3
	Herpes zoster, synovitis, carbuncle, ophthalmia, strangury, and delirium tremens, each	20	3
	Epithelioma, bilious colic, and metritis, each	20	4
64	Very little sickness, 2 weeks ending July 19.		
65	Gastritis	20	3
	See note 65 for July, on page 434.		
67	Inflammation of brain	20	6
70	Anasarca, one case, July 12. Has not been healthier for months, July 26.		
71	Syphilis	80	7
72	Sickness light, July 5.		
76	Cardiac disease	60	3
	Asthma, cardiac	20	6
	Cerebral meningitis	20	6
	One death from cancer in abdomen, week ending July 12.		
78	Asthma	60	10
	See note 78 for July, on page 434.		
80	See note 80 for July, on page 434.		
83	Mumps	20	7
84	Mumps	100	9
	Little sickness; measles more prevalent but not epidemic, July 5. Diarrhea in children more common but not severe; quite a number of cases of measles, but very mild, July 12. Quite a number of cases of diarrhea, but not severe; a few cases of dysentery, July 19. Considerable rain and weather cool; very little sickness for this time of year, July 26. Healthy, Aug. 2.		
86	Toxæmia	20	8
87	Dropsy	40	----
	Healthy again, some remittent fever, mild, and ague, July 26.		
91	Dyspepsia	100	1
	Malaria	80	4
	Cerebral meningitis	40	4
	Hysteria	20	5
93	Four cases of diphtheria in one family, 2 deaths; cause, the water supply.—Two weeks ending July 26.		

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‡, §. For explanations and references see pages 390-1.

¶ The several numbered lines on these two pages continue statements for the localities and divisions which are named and have the same line-numbers on the two preceding pages; on the right side of the page the numbers before the side-notes are the line-numbers of the localities, on pages 410-11, to which the side-notes refer.

TABLE 3.—CONTINUED.—*Diseases, by Localities in Michigan, Four Weeks ending* **August** *30, 1879.*

Line Number.	Divisions and Localities Represented, and Initials of Physicians who Reported.* (Health Officers in Italics; those also Correspondents marked with a *.)	Reports Received.	Bowels, Inflam-mat'n of.		Bron-chitis.		Cerebro-Spinal Men'gitis.		Cholera Infant-um.		Cholera Morbus.		Consump-tion, Pul-monary.		Croup, Membra-neous.		Diph-theria.		Diarrhea.		Dysen-tery.		Erysipe-las.		Fever, Intermit-tent.		Fever, Remit-tent.		Fever, Typhoid (Enteric.)	
			Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§
1	ALL LOCALITIES ‖	322	....	....	75	5.4	42	6.8	79	5.3	77	4.8	89	6.2	25	5.0	58	6.3	94	2.5	74	4.9	62	6.9	96	1.8	86	3.0	61	7.5
2	UPPER PENIN. DIV.....†	*7*	....	....	*100*	*6*	*0*	*0*	*71*	*2*	*86*	*3*	*86*	*4*	*0*	*0*	*0*	*0*	*100*	*1*	*100*	*4*	*25*	*6*	*0*	*0*	*25*	*6*	*100*	*6*
3	Houghton—H. W. J....	4	....	....	100	6	0	0	100	2	100	2	100	4	0	0	0	0	100	1	100	3	25	6	0	0	25	6	100	6
4	Ishpeming—*W. T. C.*..*	3	....	....	0	0	0	0	33	2	67	3	67	4	0	0	0	0	100	1	100	4	0	0	0	0	0	0	100	5
5	NORTH-WESTERN DIV.†	*8*	....	....	*75*	*6*	*0*	*0*	*75*	*2*	*75*	*3*	*0*	*0*	*0*	*0*	*0*	*0*	*100*	*2*	*63*	*3*	*0*	*0*	*63*	*4*	*25*	*7*	*25*	*6*
6	Cadillac—C. E. M......	4	....	....	75	6	....	....	50	2	75	3	....	....	....	....	....	....	100	1	100	3	....	....	25	4	25	7	25	6
7	Cadillac—*J. M. W.*......	4	....	....	0	0	0	0	100	1	0	0	0	0	0	0	0	0	100	2	25	3	0	0	100	3	0	0	0	0
8	NORTH-EASTERN DIV.†	*4*	....	....	*0*	*0*	*0*	*0*	*100*	*1*	*75*	*4*	*0*	*0*	*0*	*0*	*0*	*0*	*100*	*2*	*100*	*4*	*50*	*5*	*75*	*4*	*75*	*5*	*0*	*0*
9	Alpena—W. P. M.	4	....	....	0	0	0	0	100	1	75	4	0	0	0	0	0	0	100	2	100	4	50	5	75	4	75	5	0	0
10	WESTERN DIVISION...†	*27*	....	....	*50*	*8*	*25*	*8*	*89*	*7*	*70*	*5*	*83*	*8*	*0*	*0*	*87*	*6*	*96*	*3*	*87*	*4*	*75*	*8*	*100*	*2*	*93*	*3*	*63*	*9*
11	Cedar Springs—C. S. F.	4	0	0	25	6	25	8	75	10	75	6	0	0	0	0	0	0	100	4	100	5	75	5	100	1	100	3	25	5
12	Drenthe—H. K.........	4	50	5	25	5	0	0	100	4	50	3	50	5	0	0	0	0	100	2	0	0	25	6	100	2	100	5	0	0
13	Grand Haven—*J. N. R.*	3	....	....	0	0	0	0	100	2	100	4	0	0	0	0	100	5	100	1	100	3	0	0	100	4	100	5	0	0
14	Grand Haven—A. V...	4	....	....	50	5	....	....	100	5	75	4	....	....	....	....	....	....	75	2	100	3	....	....	100	2	50	5	....	....
15	Grand Rapids—A. H...	4	25	8	0	0	0	0	0	0	50	8	100	6	0	0	100	7	100	3	25	4	0	0	100	3	100	1	0	0
16	Holland—*B. L.*.........	4	....	....	0	0	0	0	0	0	50	3	0	0	0	0	50	4	100	3	100	3	100	4	100	2	100	1	0	0
17	Muskegon—*O. C. W.*...	4	....	....	100	14	0	0	75	15	100	10	100	13	0	0	100	6	100	4	100	7	100	15	100	1	100	2	100	12
18	NORTH'N-CENTR'L DIV.†	*4*	....	....	*0*	*0*	*25*	*7*	*100*	*6*	*25*	*5*	*0*	*0*	*0*	*0*	*0*	*0*	*100*	*2*	*100*	*4*	*100*	*7*	*100*	*1*	*75*	*4*	*25*	*5*
19	Big Rapids—*I. W. B.*...	4	....	....	0	0	25	7	100	6	25	5	0	0	0	0	0	0	100	2	100	4	100	7	100	1	75	4	25	5
20	BAY-AND-EAST'N DIV.†	*45*	....	....	*72*	*5*	*25*	*5*	*84*	*4*	*94*	*4*	*79*	*6*	*25*	*5*	*42*	*7*	*98*	*2*	*74*	*5*	*0*	*0*	*96*	*2*	*88*	*4*	*33*	*7*
21	Bay City—W. H. B.....	4	....	....	100	8	0	0	100	3	100	5	100	10	0	0	25	13	100	2	100	9	0	0	100	1	100	7	0	0
22	Bay City—W. R. M....	4	....	....	100	7	0	0	100	6	100	3	100	5	0	0	0	0	100	2	100	5	0	0	100	1	100	6	0	0
23	Lapeer—*H. McC.*.......	3	....	....	33	3	....	....	67	3	....	....	33	5	....	....	....	....	100	2	100	4	....	....	100	1	100	3	....	....
24	Port Huron—*E. P. T.*..	4	....	....	25	7	0	0	75	4	100	4	50	9	0	0	25	8	100	1	50	7	....	....	100	3	100	6	25	8
25	Port Huron—A. A. W..	4	....	....	100	2	0	0	0	0	75	5	50	5	0	0	0	0	100	4	50	5	0	0	75	1	50	2	0	0
26	Port Sanilac—J. M. L.	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	100	1	....	....	....	....	100	2	100	3	..	....
27	Saginaw City—*E. A. H.*	4	....	....	100	9	0	0	50	7	100	7	100	8	0	0	50	9	100	2	100	5	0	0	100	2	100	3	50	12
28	Saginaw City—N. D. L.	4	....	....	100	4	0	0	100	4	100	5	100	4	0	0	75	5	100	3	100	5	0	0	100	1	100	5	0	0
29	St. Clair—*C. G. R.*......	4	....	....	0	0	0	0	0	0	75	3	100	4	0	0	25	3	75	2	50	3	0	0	75	2	25	2	25	1
30	Thornville—J. S. C. ...	4	75	6	100	5	0	0	0	0	100	4	50	6	0	0	0	0	100	1	25	7	0	0	100	2	0	0	0	0
31	W. Bay City—*J. W. H.*	4	....	....	25	3	25	3	75	3	0	0	75	3	25	3	0	0	100	2	75	3	0	0	100	1	100	2	0	0
32	W. Bay City—*I. E. R.**	4	....	....	25	3	25	6	100	4	100	3	100	4	25	6	50	5	100	4	75	5	0	0	100	1	100	2	0	0
33	CENTRAL DIVISION....†	*71*	....	....	*70*	*5*	*0*	*0*	*85*	*5*	*66*	*5*	*97*	*6*	*25*	*4*	*72*	*6*	*87*	*3*	*63*	*5*	*52*	*7*	*97*	*2*	*89*	*3*	*60*	*5*
34	Charlotte—G. B. A. ...	4	....	....	100	5	0	0	100	8	100	10	100	14	0	0	50	15	100	2	100	11	0	0	100	2	100	4	0	0
35	Charlotte—*P. D. P.*.....	4	....	....	100	7	0	0	100	5	100	4	75	10	0	0	0	0	100	4	100	7	75	12	100	1	100	2	0	0
36	Corunna—*A. G. B.*.....	4	....	....	0	0	0	0	100	5	100	5	100	8	0	0	75	8	100	3	50	6	75	8	100	2	100	2	100	10
37	DeWitt—G. W. T......	4	....	....	100	4	0	0	0	0	0	0	100	5	0	0	50	5	100	2	100	5	0	0	100	1	100	3	0	0
38	Elsie—E. V. C.........	4	...	....	50	4	0	0	100	3	75	3	0	0	0	0	0	0	25	2	0	0	0	0	100	1	100	4	0	0
39	Greenville—*J. M.*	3	....	....	0	0	0	0	33	8	33	9	100	6	0	0	0	0	100	5	100	8	100	8	100	1	100	2	0	0
40	Hastings—A. P. D.	4	....	....	0	0	0	0	0	0	100	3	100	4	0	0	0	0	75	2	50	3	0	0	100	1	25	2	0	0
41	Hubbardston—H. W. B.	4	25	14	25	13	....	....	100	9	25	10	100	11	0	0	25	8	100	6	75	9	0	0	100	2	100	1	....	....
42	Ionia, H. of C.—W. F. R.	4	75	4	50	4	0	0	0	0	25	4	0	0	0	0	0	0	100	3	25	3	25	5	100	1	100	3	0	0
43	Ionia—*S. V. R.*..........	4	....	....	0	0	0	0	0	0	25	5	100	4	0	0	0	0	100	3	50	4	0	0	100	1	100	2	25	4

44	Ithaca—I. N. M.	4	----	----	----	----	----	----	75	3	----	----	75	3	----	----	100	2	100	2	----	----	----	----	50	4	75	2	----	----
45	Lansing—*J. H. W.*	4	----	----	100	5	0	0	100	2	100	3	100	5	0	0	75	4	100	2	25	3	0	0	100	2	100	2	25	4
46	Muir—L. S. S.	4	0	0	0	0	0	0	0	0	0	0	100	6	0	0	0	0	25	3	25	3	0	0	100	1	100	4	0	0
47	North Lansing—O. M.	4	25	5	25	4	0	0	100	3	100	4	100	3	0	0	100	3	100	2	25	4	25	4	100	1	75	4	0	0
48	Otisville—A. W. N.	4	----	----	100	4	0	0	0	0	50	5	100	4	0	0	0	0	100	2	100	4	25	6	100	1	0	0	0	0
49	Ovid—O. B. C.	4	----	----	----	----	----	----	25	3	25	2	----	----	----	----	----	----	75	2	----	----	----	----	----	----	50	1	50	2
50	Vernon—D. C. H.	4	----	----	0	0	0	0	100	2	100	2	100	6	0	0	0	0	100	1	0	0	0	0	100	2	100	3	0	0
51	Webberville—R. B. S.	4	----	----	50	4	0	0	75	4	25	5	100	4	25	4	100	3	75	3	0	0	0	0	100	2	0	0	100	5
52	SOUTH-WESTERN DIV.†	*38*	----	----	*75*	*5*	*75*	*7*	*73*	*6*	*85*	*4*	*88*	*6*	*25*	*7*	*65*	*4*	*84*	*3*	*73*	*4*	*25*	*4*	*92*	*2*	*82*	*2*	*25*	*14*
53	Allegan—W. H. B.	4	25	5	75	5	75	7	100	5	75	4	100	7	0	0	25	2	75	2	75	3	0	0	100	2	100	3	0	0
54	Cassopolis—F. G.	4	75	5	----	----	----	----	75	4	100	3	25	4	25	7	100	3	100	2	----	----	----	----	100	3	----	----	----	----
55	Dayton—W. A. N.	4	25	7	75	4	0	0	75	6	100	6	0	0	0	0	0	0	100	2	100	4	25	7	100	2	100	2	0	0
56	Dowagiac—*E. C. P.*	3	----	----	0	0	0	0	0	0	67	2	0	0	0	0	0	0	67	3	0	0	0	0	67	1	33	1	0	0
57	Mattawan—T. H. B.	3	----	----	0	0	0	0	67	5	100	5	0	0	0	0	0	0	100	3	67	3	0	0	67	4	33	3	0	0
58	Niles—J. S. R.	4	----	----	100	6	0	0	25	13	100	10	100	7	0	0	0	0	100	4	75	10	25	4	75	3	100	1	25	14
59	Niles—*I. S.*	4	----	----	100	9	----	----	----	----	100	5	100	9	----	----	25	7	100	4	----	----	----	----	100	2	100	3	----	----
60	Otsego—M. C.	4	----	----	0	0	0	0	0	0	0	0	100	4	0	0	75	3	25	2	0	0	25	3	100	1	50	2	0	0
61	Paw Paw—J. A.	4	----	----	25	3	0	0	0	0	25	3	100	3	0	0	0	0	75	2	25	3	25	3	100	1	100	2	0	0
62	St. Joseph—R. F. S.	4	----	----	0	0	0	0	100	2	100	2	0	0	0	0	100	3	100	2	100	2	0	0	100	1	100	1	0	0
63	SOUTH'N-CENTR'L DIV.†	*71*	----	----	*78*	*5*	*75*	*10*	*60*	*6*	*79*	*5*	*82*	*6*	*0*	*0*	*25*	*7*	*100*	*3*	*69*	*4*	*74*	*6*	*100*	*2*	*89*	*3*	*88*	*7*
64	Adrian—*A. M. S.*	4	----	----	50	4	0	0	50	5	100	2	100	3	0	0	0	0	100	3	25	2	75	3	100	1	100	4	0	0
65	Albion—J. P. S.	3	----	----	100	8	0	0	100	8	100	6	100	9	0	0	0	0	100	1	67	6	100	8	100	2	100	3	0	0
66	Battle Creek—*S. S. F.**	4	----	----	----	----	----	----	100	4	100	2	25	9	----	----	----	----	100	1	50	3	100	7	100	4	100	5	100	8
67	Brooklyn—E. N. P.	4	----	----	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	3	50	5	0	0	100	1	75	3	0	0
68	Centreville—M. S.	4	0	0	75	5	0	0	25	5	100	3	0	0	0	0	0	0	100	2	100	4	0	0	100	1	100	2	0	0
69	Clinton—A. W. A.	4	75	13	0	0	75	10	25	7	50	7	100	10	0	0	0	0	100	3	75	5	50	10	100	1	100	2	0	0
70	Coldwater—*G. V. V.*	4	----	----	0	0	0	0	50	6	100	5	100	7	0	0	25	8	100	2	50	7	0	0	100	1	50	8	0	0
71	Hillsdale—*J. W. F.**	4	----	----	25	6	0	0	50	5	100	3	25	5	0	0	25	5	100	2	100	3	100	2	100	3	100	2	0	0
72	Jackson (*State P.*) E. L. K.	4	----	----	100	1	----	----	----	----	25	7	100	4	----	----	----	----	100	3	100	6	----	----	100	3	----	----	75	6
73	Jackson—W. W.	4	----	----	----	----	----	----	100	4	75	5	100	5	----	----	----	----	100	2	----	----	----	----	100	4	100	2	----	----
74	Kalamazoo—W. B. S.	4	0	0	0	0	0	0	100	6	100	5	100	7	0	0	0	0	100	3	75	7	0	0	100	1	100	2	0	0
75	Marshall—H. L. J.*	4	----	----	----	----	0	0	50	5	100	4	0	0	0	0	0	0	100	4	0	0	0	0	100	2	75	2	0	0
76	Mendon—H. C. C.	4	----	----	100	5	0	0	0	0	50	5	100	6	0	0	25	7	100	3	100	4	75	7	100	1	100	2	0	0
77	Mendon—E. S.	4	----	----	0	0	----	----	0	0	75	4	50	4	0	0	0	0	100	2	50	3	25	3	100	2	100	2	0	0
78	Sturgis—N. I. P.	4	----	----	0	0	0	0	25	5	75	4	75	6	0	0	0	0	100	3	50	5	0	0	100	2	100	1	0	0
79	Three Rivers—C. W. B.	4	----	----	100	6	0	0	50	9	100	6	100	10	0	0	0	0	100	3	0	0	0	0	100	1	100	3	0	0
80	Union City—N. H. C.	4	0	0	0	0	0	0	0	0	25	7	0	0	0	0	0	0	100	3	75	4	0	0	100	2	0	0	0	0
81	Ypsilanti—*E. B.**	4	0	0	0	0	0	0	0	0	0	0	75	3	0	0	0	0	0	0	75	2	0	0	100	1	25	2	0	0
82	SOUTH-EASTERN DIV.†	*47*	----	----	*100*	*5*	*0*	*0*	*90*	*7*	*77*	*6*	*100*	*7*	*0*	*0*	*50*	*8*	*96*	*3*	*81*	*7*	*81*	*12*	*98*	*2*	*89*	*3*	*100*	*15*
83	Detroit—L. C.	4	----	----	100	4	0	0	100	16	100	17	100	8	0	0	100	17	100	3	100	15	100	17	100	3	100	7	0	0
84	Detroit—*E. L.*	4	----	----	100	8	0	0	100	4	100	5	100	10	0	0	100	8	100	5	100	5	100	11	100	1	100	2	100	11
85	Detroit—W. H. R.	4	25	12	100	7	0	0	100	14	100	7	100	7	0	0	25	20	100	4	100	12	100	17	100	2	100	3	100	18
86	Milford—R. J.	4	----	----	100	4	0	0	50	5	25	4	100	5	0	0	25	5	100	2	100	3	0	0	75	1	25	1	0	0
87	Monroe—*A. J. M.*	4	----	----	0	0	0	0	50	5	100	5	100	7	0	0	25	3	100	4	0	0	25	1	100	1	75	2	0	0
88	Northville—J. M. S.	4	----	----	0	0	0	0	0	0	0	0	100	4	0	0	25	3	50	3	25	5	0	0	100	2	100	1	0	0
89	Pontiac—W. G. E.	3	----	----	0	0	0	0	100	8	100	3	100	9	0	0	0	0	100	2	0	0	0	0	100	1	100	4	0	0
90	Trenton—W. C.	4	0	0	0	0	0	0	100	5	25	4	0	0	0	0	25	4	100	3	25	4	0	0	100	2	100	1	0	0
91	Utica—G. G. R.	4	25	6	0	0	0	0	100	5	100	5	100	7	0	0	0	0	100	1	100	4	0	0	100	2	100	3	0	0
92	Washington—A. Y.	4	----	----	100	3	0	0	0	0	50	5	100	4	0	0	0	0	100	3	100	4	0	0	0	0	75	5	0	0
93	Wyandotte—E. P. C.	4	----	----	100	3	0	0	100	3	75	4	100	4	0	0	¶ 75	4	100	3	0	0	0	0	100	1	100	2	0	0
94	Wyandotte—*T. J. L.*	4	----	----	0	0	0	0	100	4	75	5	100	7	0	0	0	0	100	3	0	0	0	0	100	1	100	2	0	0

*, †, ‡, §, ‖. For explanations and references, see foot-notes on pages 390-1.

¶ A full report by Dr. E. P. Christain of a case of diphtheria occurring in Aug. is given in the first part of this Report.

Less than average of summer complaint among children, and no serious cases so far as I know. Two sporadic cases of scarlet fever. General health extremely good.—*Rev. A. W. Bill, of Menominee, on Aug. meteorological register.*

TABLE 3.—*Diseases, by Localities, in Michigan, Four Weeks ending* **August** *30, 1879*—CONTINUED.

LINE NUMBER. ¶	Fever, Typho-Malarial: Per ct. of Weeks Present.‡	Fever, Typho-Malarial: Av. Ord. of Prev. when Present.§	Influenza: Per ct. of Weeks Present.‡	Influenza: Av. Ord. of Prev. when Present.§	Measles: Per ct. of Weeks Present.‡	Measles: Av. Ord. of Prev. when Present.§	Neuralgia: Per ct. of Weeks Present.‡	Neuralgia: Av. Ord. of Prev. when Present.§	Pneumonia: Per ct. of Weeks Present.‡	Pneumonia: Av. Ord. of Prev. when Present.§	Puerperal Fever: Per ct. of Weeks Present.‡	Puerperal Fever: Av. Ord. of Prev. when Present.§	Rheumatism: Per ct. of Weeks Present.‡	Rheumatism: Av. Ord. of Prev. when Present.§	Scarlatina: Per ct. of Weeks Present.‡	Scarlatina: Av. Ord. of Prev. when Present.§	Small-pox: Per ct. of Weeks Present.‡	Small-pox: Av. Ord. of Prev. when Present.§	Tonsillitis: Per ct. of Weeks Present.‡	Tonsillitis: Av. Ord. of Prev. when Present.§	Whooping-Cough: Per ct. of Weeks Present.‡	Whooping-Cough: Av. Ord. of Prev. when Present.§
1	72	5.7	68	5.9	79	7.1	77	5.4	64	8.1	25	14.0	82	5.8	55	7.6	0	0	56	5.7	74	6.5
2	*0*	*0*	*50*	*5*	*0*	*0*	*67*	*3*	*0*	*0*	*0*	*0*	*100*	*3*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
3	0	0	50	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	67	3	0	0	0	0	100	3	0	0	0	0	----	----	0	0
5	*63*	*4*	*25*	*5*	*0*	*0*	*50*	*4*	*0*	*0*	*0*	*0*	*100*	*5*	*0*	*0*	*0*	*0*	*25*	*5*	*25*	*7*
6	50	5	25	5	----	----	50	5	----	----	----	----	100	5	----	----	----	----	25	6	25	7
7	75	3	0	0	0	0	50	3	0	0	0	0	0	0	0	0	0	0	25	3	0	0
8	*50*	*5*	*0*	*0*	*0*	*0*	*100*	*4*	*0*	*0*	*0*	*0*	*25*	*4*	*50*	*5*	*0*	*0*	*50*	*5*	*0*	*0*
9	50	5	0	0	0	0	100	4	0	0	0	0	25	4	50	5	0	0	50	5	0	0
10	*92*	*7*	*88*	*6*	*100*	*5*	*71*	*6*	*38*	*5*	*0*	*0*	*88*	*7*	*60*	*10*	*0*	*0*	*69*	*6*	*100*	*12*
11	100	5	0	0	0	0	25	7	0	0	0	0	100	8	0	0	0	0	0	0	100	6
12	0	0	0	0	----	----	100	4	0	0	0	0	100	5	0	0	0	0	25	5	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	7	0	0	0	0	0	0
14	----	----	----	----	----	----	50	7	----	----	----	----	50	7	50	7	----	----	50	8	0	0
15	75	7	100	4	100	5	100	6	0	0	0	0	0	0	75	7	0	0	100	4	0	0
16	0	0	0	0	0	0	50	4	50	4	0	0	0	0	0	0	0	0	0	0	0	0
17	100	10	75	8	0	0	100	5	25	5	0	0	100	9	75	17	0	0	100	7	100	17
18	*100*	*6*	*0*	*0*	*0*	*0*	*100*	*6*	*0*	*0*	*0*	*0*	*100*	*5*	*0*	*0*	*0*	*0*	*50*	*7*	----	----
19	100	6	0	0	0	0	100	6	0	0	0	0	100	5	0	0	0	0	50	7	----	----
20	*59*	*6*	*50*	*7*	*63*	*8*	*81*	*5*	*63*	*9*	*25*	*9*	*82*	*5*	*25*	*12*	*0*	*0*	*69*	*5*	*56*	*7*
21	100	11	100	6	0	0	100	12	0	0	0	0	100	5	0	0	0	0	----	----	25	13
22	50	8	25	7	0	0	----	----	100	7	0	0	100	7	0	0	0	0	----	----	0	0
23	----	----	----	----	----	----	----	----	----	----	----	----	33	4	----	----	----	----	----	----	----	----
24	50	3	0	0	0	0	50	5	0	0	25	9	75	6	0	0	0	0	----	----	0	0
25	0	0	50	7	0	0	75	6	0	0	0	0	75	5	0	0	0	0	0	0	0	0
26	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
27	25	10	50	11	50	10	100	4	25	11	0	0	100	8	25	12	0	0	75	9	25	10
28	75	5	0	0	0	0	100	2	0	0	0	0	100	3	0	0	0	0	75	4	0	0
29	0	0	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	0	0
30	50	5	0	0	0	0	100	4	0	0	0	0	100	5	0	0	0	0	0	0	0	0
31	100	3	0	0	0	0	25	2	0	0	0	0	25	4	0	0	0	0	25	3	75	3
32	25	5	25	2	75	6	100	6	0	0	0	0	100	5	0	0	0	0	100	4	100	3
33	*63*	*7*	*75*	*8*	*0*	*0*	*87*	*6*	*63*	*9*	*0*	*0*	*81*	*6*	*42*	*5*	*0*	*0*	*53*	*6*	*88*	*4*
34	100	11	100	6	0	0	100	11	100	12	0	0	100	9	0	0	0	0	100	12	100	6
35	0	0	100	8	0	0	100	8	0	0	0	0	100	10	0	0	0	0	75	11	0	0
36	100	11	25	13	0	0	100	9	25	14	0	0	100	10	0	0	0	0	0	0	0	0
37	0	0	0	0	0	0	100	3	0	0	0	0	100	4	0	0	0	0	100	4	100	4
38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	6	0	0
39	100	3	0	0	0	0	100	5	0	0	0	0	100	8	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	5	0	0
41	75	11	75	4	0	0	75	8	0	0	0	0	100	6	0	0	0	0	0	0	100	3
42	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	75	4	0	0
43	0	0	0	0	0	0	----	----	0	0	0	0	0	0	25	7	0	0	----	----	0	0

	DISEASES REPORTED WHICH WERE NOT PRINTED ON THE BLANKS, AMOUNT OF SICKNESS, ETC. ¶	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§
3	Mumps	100	4
9	Menorrhagia	50	5
	Spinal congestion, otorrhea, and conjunctivitis, each	25	5
12	Dyspepsia	50	3
	Infantile convulsions	25	4
15	Rose Rash	25	5
	Cholera	25	9
16	Bilious fever	50	4
19	Gastritis	25	7
21	Pharyngitis	25	6
22	Mostly miasmatic and summer complaints.		
25	Sickness light, nothing of much account except malarial, and not much of that, Aug. 26.		
26	See note 26 for August, page 434.		
27	Dyspepsia	75	8
28	A little less sickness than last week; very dry, Aug. 9. Sickness about as last week, Aug. 16. Sickness generally less than last week,—and less than usual all summer, Aug. 23. Quite healthy for this time of the year; very dry weather, Aug. 30.		
37	Ophthalmia	50	4
	Dropsy	100	5
	Urticaria	50	5
	Anemia	75	5
41	Catarrh	75	7
	Inflammation of brain	25	15
	Pemphigus	25	11
42	Hay fever	25	2
46	Intermittents prevail, with a tendency to inflammation of lungs, Aug. 9. The whooping cough seems to be confined to children, Aug. 16. A number of the children have spasms at the commencement of the intermittent, Aug. 23.		
47	Inflammation of brain	25	4
48	Intermittents about the same as previous week, Aug. 9.		
50	Generally healthy for the time of year; diarrhea in its simple form the most widely prevalent, Aug. 9. Whooping cough confined to two families.		

44	----	----	----	----	----	----	25	6	----	----	----	----	25	4	----	----	----	----	25	3	0	0
45	25	3	0	0	0	0	75	5	0	0	0	0	100	5	0	0	0	0	0	0	0	0
46	0	0	0	0	0	0	0	0	0	0	0	0	100	5	75	3	0	0	0	0	75	2
47	0	0	0	0	0	0	0	0	25	4	0	0	75	5	0	0	0	0	0	0	0	0
48	0	0	0	0	0	0	0	0	0	0	0	0	25	5	25	5	0	0	25	4	0	0
49	25	4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	50	2	----	----
50	0	0	0	0	0	0	100	4	0	0	0	0	50	5	0	0	0	0	0	0	50	5
51	25	5	0	0	0	0	0	0	100	4	0	0	0	0	0	0	0	0	25	5	100	2
52	*73*	*2*	*60*	*5*	*0*	*0*	*78*	*5*	*25*	*7*	*0*	*0*	*59*	*5*	*33*	*7*	*0*	*0*	*33*	*5*	*63*	*7*
53	0	0	0	0	0	0	75	5	25	8	0	0	25	3	0	0	0	0	25	3	0	0
54	----	----	----	----	----	----	----	----	----	----	----	----	25	4	----	----	----	----	----	----	----	----
55	0	0	100	4	0	0	50	6	0	0	0	0	25	6	0	0	0	0	50	5	0	0
56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	33	2	0	0
57	100	1	0	0	0	0	100	3	0	0	0	0	67	5	0	0	0	0	----	----	0	0
58	25	2	50	9	0	0	100	6	25	11	0	0	100	5	25	9	0	0	25	8	25	10
59	----	----	----	----	----	----	100	7	----	----	----	----	75	6	50	8	----	----	----	----	100	3
60	0	0	25	3	0	0	25	5	0	0	0	0	0	0	0	0	0	0	----	----	0	0
61	100	3	25	4	0	0	100	3	25	3	0	0	100	4	0	0	0	0	---	----	0	0
62	0	0	100	3	0	0	----	----	0	0	0	0	0	0	25	5	0	0	----	----	0	0
63	*88*	*5*	*73*	*5*	*0*	*0*	*70*	*5*	*82*	*7*	*0*	*0*	*83*	*6*	*75*	*6*	*0*	*0*	*70*	*7*	*75*	*5*
64	0	0	0	0	0	0	75	4	75	4	0	0	100	3	0	0	0	0	50	5	0	0
65	0	0	100	7	0	0	67	7	67	10	----	----	100	6	0	0	0	0	67	12	----	----
66	----	----	----	----	----	----	25	7	----	----	----	----	----	----	----	----	----	----	----	----	----	----
67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	4	0	0	0	0	0	0
68	0	0	100	4	0	0	100	6	0	0	0	0	100	6	0	0	0	0	75	5	0	0
69	100	9	0	0	0	0	100	5	0	0	0	0	75	7	0	0	0	0	75	9	75	7
70	0	0	0	0	0	0	100	3	0	0	0	0	100	6	0	0	0	0	0	0	25	5
71	100	2	50	4	0	0	50	3	0	0	0	0	100	3	0	0	0	0	50	5	0	0
72	----	----	----	----	----	----	----	----	100	7	----	----	100	4	----	----	----	----	75	6	----	----
73	75	6	75	3	----	----	----	----	----	----	----	----	50	8	100	7	----	----	----	----	----	----
74	100	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
75	75	4	0	0	0	0	25	4	0	0	0	0	25	5	0	0	0	0	0	0	0	0
76	0	0	0	0	0	0	50	6	0	0	0	0	100	7	0	0	0	0	0	0	0	0
77	0	0	25	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
78	0	0	0	0	0	0	50	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
79	0	0	100	5	0	0	100	7	0	0	0	0	100	8	0	0	0	0	----	----	100	6
80	0	0	0	0	0	0	100	5	0	0	0	0	50	8	0	0	0	0	100	6	100	1
81	75	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
82	*81*	*7*	*100*	*7*	*81*	*7*	*74*	*6*	*90*	*10*	*25*	*19*	*100*	*7*	*74*	*8*	*0*	*0*	*55*	*6*	*75*	*10*
83	100	8	100	7	100	10	100	6	75	15	0	0	100	5	100	11	0	0	100	5	100	12
84	100	9	100	11	100	5	100	8	100	11	0	0	100	8	100	6	0	0	50	11	100	11
85	0	0	100	4	100	11	100	9	100	14	25	19	100	13	100	14	0	0	100	4	0	0
86	25	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
87	0	0	0	0	0	0	50	9	100	6	0	0	100	8	0	0	0	0	0	0	0	0
88	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	4	0	0
89	0	0	0	0	0	0	100	5	0	0	0	0	100	6	33	7	0	0	67	7	0	0
90	100	4	0	0	0	0	0	0	0	0	0	0	100	5	0	0	0	0	25	4	0	0
91	0	0	0	0	0	0	25	5	0	0	0	0	0	0	0	0	0	0	50	8	0	0
92	0	0	0	0	25	3	100	3	0	0	0	0	100	2	0	0	0	0	0	0	0	0
93	0	0	0	0	0	0	25	4	75	4	0	0	0	0	25	4	0	0	25	4	0	0
94	0	0	0	0	0	0	----	----	0	0	0	0	100	6	0	0	0	0	----	----	25	8

55	Spasmodic croup	25	5
56	Hysteria	33	4
	No sickness week ending Aug. 16.		
57	Metritis	33	2
	Bright's disease (acute) and acute mania each	33	7
59	The prevailing sickness is fever of the typho-malarial character, with great disturbance of the stomach and bowels, about Aug. 31.		
60	Anthrax	25	4
61	Gonorrhea, epithelioma, gastrodynia, hepatitis, peritonitis, and catarrh, each	25	4
	Locomotor ataxy	75	3
	Dyspepsia	50	4
	Spinal irritation, mammitis, gastralgia, congestive chills, and sciatica, each	25	3
64	Hay asthma	25	2
66	One death, malarial fever with congestion of stomach, week ending Aug. 30.		
76	Malignant intermittent (one case died), week ending Aug. 16	25	7
	Uræmia	25	9
77	Cerebral meningitis	25	4
	Influenza or hay fever, week ending Aug. 30.		
79	Not very sickly, weeks ending Aug. 9, 16, and 30.		
81	Intermittents prevail largely and influence all disease, Aug. 16. Many cases of incipient pulmonary consumption		
85	Inflammation of brain	25	17
	Mumps	75	16
	No epidemic, very little sickness for the season, Aug. 9. Rather more cases of dysentery; health of city good, Aug. 16. Not much sickness; some increase of influenza, Aug. 23. Quite a number of cases of influenza (diphtheria so called), Aug. 30.		
88	Healthy, Aug. 9. Colder weather seemed to affect bowels, Aug. 16. Very healthy, Aug. 30.		
92	Dyspepsia	100	1
	Malaria and hysteria, each	100	4
	Cystitis	100	5
	Enteritis	50	6
	Asthma	25	6
	During the first half of the month the moisture in the air was so abundant, and the temperature so uniformly high that unhusked corn in the shock, also corn in the corn cribs began to grow vigorously. During the third week of the month malarial diseases rapidly arose, which I think was partially due to the prolonged uniform heat and moisture. There was also one-half less ozone during the first half than during the last half of the month, Aug. 31.		

‡, §. For explanations and references see pages 390–1.

¶ The several numbered lines on these two pages continue statements for the localities and divisions which are named and have the same line numbers on the two preceding pages; on the right side of the page the numbers before the side-notes are the line numbers of the localities, on pages 414–5, to which the side-notes refer.

TABLE 3—CONTINUED.—*Diseases, by Localities in Michigan, Four Weeks ending* **September** *27, 1879.*

LINE NUMBER.	DIVISIONS AND LOCALITIES REPRESENTED, AND INITIALS OF PHYSICIANS WHO REPORTED.* (Health Officers in italics; those also Correspondents marked with a *.)	Reports Received.	Bowels, Inflam-mat'n of.		Bron-chitis.		Cerebro-Spinal Men'gitis.		Cholera Infant-um.		Cholera Morbus.		Consump-tion, Pul-monary.		Croup Membra-neous.		Diph-theria.		Diarrhea.		Dysen-tery.		Erysip-elas.		Fever, Intermit-tent.		Fever, Remit-tent.		Fever, Typhoid (Enteric.)	
			Per cent of Weeks Present.‡	Av. Order of Preva-lence when Present.§	Per cent of Weeks Present.‡	Av. Order of Preva-lence when Present.§	Per cent of Weeks Present.‡	Av. Order of Preva-lence when Present.§	Per cent of Weeks Present.‡	Av. Order of Preva-lence when Present.§	Per cent of Weeks Present.‡	Av. Order of Preva-lence when Present.§	Per cent of Weeks Present.‡	Av. Order of Preva-lence when Present.§	Per cent of Weeks Present.‡	Av. Order of Preva-lence when Present.§	Per cent of Weeks Present.‡	Av. Order of Preva-lence when Present.§	Per cent of Weeks Present.‡	Av. Order of Preva-lence when Present.§	Per cent of Weeks Present.‡	Av. Order of Preva-lence when Present.§	Per cent of Weeks Present.‡	Av. Order of Preva-lence when Present.§	Per cent of Weeks Present.‡	Av. Order of Preva-lence when Present.§	Per cent of Weeks Present.‡	Av. Order of Preva-lence when Present.§	Per cent of Weeks Present.‡	Av. Order of Preva-lence when Present.§
1	ALL LOCALITIES ‖	319	----	----	78	4.4	25	12.0	55	5.7	60	5.5	91	6.0	33	5.4	63	5.8	86	3.2	64	5 1	52	7.1	97	1.7	85	2.5	63	6.7
2	UPPER-PENIN. DIV. †	*12*	----	----	*33*	*3*	*0*	*0*	*50*	*3*	*100*	*3*	*100*	*4*	*0*	*0*	*0*	*0*	*100*	*1*	*75*	*4*	*0*	*0*	*0*	*0*	*50*	*6*	*100*	*5*
3	Houghton—H. W. J.	4	----	----	50	5	0	0	75	2	100	3	100	2	0	0	0	0	100	1	50	4	0	0	0	0	0	0	100	5
4	Ishpeming—*W. T. C.* *	4	----	----	25	2	0	0	0	0	0	0	100	6	0	0	0	0	100	1	100	4	0	0	0	0	50	6	0	0
5	Marquette—*G. J. N.* *	4	0	0	25	3	0	0	25	3	0	0	100	4	0	0	0	0	100	2	0	0	0	0	0	0	0	0	0	0
6	NORTH-WESTERN DIV. †	*8*	----	----	*100*	*2*	*0*	*0*	*25*	*2*	*25*	*2*	*25*	*6*	*0*	*0*	*25*	*2*	*100*	*3*	*0*	*0*	*0*	*0*	*100*	*2*	*0*	*0*	*0*	*0*
7	Cadillac—C. E. M.	4	----	----	100	2	0	0	0	0	0	0	25	6	0	0	0	0	100	3	0	0	0	0	100	2	0	0	0	0
8	Cadillac—*J. M. W.*	4	----	----	0	0	0	0	25	2	25	2	0	0	0	0	25	2	100	2	0	0	0	0	100	2	0	0	0	0
9	NORTH-EASTERN DIV. †	*4*	----	----	*25*	*3*	*0*	*0*	*100*	*2*	*75*	*3*	*0*	*0*	*0*	*0*	*0*	*0*	*100*	*1*	*75*	*2*	*25*	*6*	*75*	*5*	*50*	*4*	*0*	*0*
10	Alpena—W. P. M.	4	----	----	25	3	0	0	100	2	75	3	0	0	0	0	0	0	100	1	75	2	25	6	75	5	50	4	0	0
11	WESTERN DIVISION †	*23*	----	----	*80*	*7*	*25*	*20*	*42*	*8*	*47*	*8*	*91*	*9*	*100*	*7*	*93*	*5*	*83*	*4*	*63*	*6*	*82*	*11*	*100*	*2*	*87*	*2*	*71*	*12*
12	Cedar Springs—C. S. F.	4	0	0	0	0	0	0	25	9	25	10	0	0	0	0	0	0	75	5	75	5	100	7	100	1	100	2	0	0
13	Drenthe—H. K.	4	0	0	75	4	0	0	25	5	25	5	0	0	0	0	0	0	100	3	25	5	0	0	100	3	100	4	0	0
14	Grand Haven—A. V.	4	----	----	75	4	0	0	25	5	25	4	0	0	0	0	75	6	75	4	50	5	0	0	100	1	25	2	0	0
15	Grand Rapids—*L. DeP.*	3	33	6	67	6	0	0	67	7	67	9	67	6	100	7	100	1	100	3	67	8	33	11	100	3	100	3	33	10
16	Grand Rapids—A. H.	4	0	0	0	0	0	0	0	0	0	0	100	5	0	0	100	6	50	7	0	0	0	0	100	2	100	1	0	0
17	Muskegon—*O. C. W.*	4	----	----	100	12	25	20	75	12	100	10	100	15	0	0	100	5	100	3	100	7	100	14	100	1	100	2	100	13
18	NORTH'N-CENTRAL DIV. †	*4*	----	----	*0*	*0*	*0*	*0*	*0*	*0*	*25*	*4*	*0*	*0*	*0*	*0*	*0*	*0*	*50*	*3*	*25*	*2*	*25*	*4*	*100*	*1*	*25*	*2*	*50*	*6*
19	Big Rapids—*I. W. B.*	4	----	----	0	0	0	0	0	0	25	4	0	0	0	0	0	0	50	3	25	2	25	4	100	1	25	2	50	6
20	BAY AND EASTERN DIV. †	*46*	----	----	*86*	*5*	*0*	*0*	*63*	*5*	*63*	*6*	*86*	*6*	*25*	*5*	*42*	*7*	*78*	*3*	*69*	*6*	*33*	*4*	*96*	*1*	*94*	*3*	*33*	*6*
21	Bay City—W. H. B.	4	----	----	100	4	0	0	100	7	75	9	100	10	0	0	0	0	100	4	100	9	0	0	100	1	100	6	0	0
22	Bay City—W. R. M.	4	----	----	100	6	0	0	50	6	50	4	100	5	0	0	0	0	100	2	100	5	0	0	100	1	100	3	50	5
23	Lapeer—*H. McC.*	2	----	----	----	----	----	----	100	2	----	----	----	----	----	----	----	----	100	1	----	----	----	----	100	1	100	3	----	----
24	Port Huron—*E. P. T.*	4	----	----	25	5	0	0	25	6	25	3	50	10	0	0	0	0	100	2	25	7	0	0	100	2	50	2	25	10
25	Port Huron—A. A. W.	4	50	7	100	2	0	0	50	6	50	5	50	8	25	6	0	0	75	4	50	5	0	0	100	1	100	3	0	0
26	Port Sanilac—J. M. L.	4	----	----	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	1	0	0	0	0	50	2	0	0	0	0
27	Saginaw City—*E. A. H.*	4	----	----	100	7	0	0	50	5	25	9	100	7	0	0	25	11	75	3	50	11	0	0	100	1	100	4	25	4
28	Saginaw City—N. D. L.	4	----	----	100	4	0	0	100	5	100	5	100	5	0	0	75	5	100	3	50	5	25	5	100	1	0	0	0	0
29	St. Clair—*C. G. R.*	4	----	----	0	0	0	0	0	0	0	0	100	4	0	0	0	0	25	4	0	0	25	4	100	2	100	3	0	0
30	Thornville—J. S. C.	4	0	0	100	5	0	0	0	0	100	5	0	0	0	0	0	0	100	1	100	5	0	0	100	2	0	0	0	0
31	W. Bay City—J. W. H.	4	----	----	50	3	0	0	0	0	0	0	75	3	25	3	0	0	50	3	0	0	50	4	100	1	100	1	0	0
32	W. Bay City—*I. E. R.* *	4	----	----	100	5	0	0	50	6	75	5	100	4	0	0	25	6	100	5	75	4	0	0	100	2	100	1	0	0
33	CENTRAL DIVISION †	*68*	----	----	*70*	*5*	*0*	*0*	*59*	*4*	*55*	*5*	*89*	*6*	*25*	*5*	*67*	*4*	*88*	*3*	*69*	*5*	*42*	*5*	*93*	*2*	*77*	*3*	*71*	*5*
34	Charlotte—G. B. A.	4	----	----	100	3	0	0	100	9	50	9	100	15	0	0	75	13	100	3	100	11	0	0	100	2	100	6	0	0
35	Charlotte—*P. D. P.*	4	0	0	100	7	0	0	100	5	100	5	100	9	0	0	0	0	100	3	100	5	0	0	100	2	100	1	0	0
36	Corunna—*A. G. B.*	4	50	14	75	12	0	0	25	7	0	0	100	7	0	0	0	0	100	5	100	6	100	7	100	2	100	2	50	11
37	DeWitt—G. W. T.	4	----	----	100	4	0	0	0	0	25	5	100	5	0	0	0	0	100	1	100	5	25	5	100	2	100	3	75	5
38	Elsie—E. V. C.	4	----	----	0	0	0	0	50	4	50	5	0	0	0	0	0	0	100	3	50	4	0	0	100	2	100	2	0	0
39	Hastings—A. P. D.	4	----	----	0	0	0	0	0	0	25	4	100	4	0	0	----	----	100	3	50	3	0	0	100	1	50	2	0	0

40	Hubbardston—H. W. B.	4	0	0	0	0	0	0	50	6	50	8	100	8	0	0	0	0	75	3	100	4	0	0	100	2	50	2	100	7
41	Ionia (H. of C.)—W. F. R.	4	25	4	50	3	0	0	0	0	0	0	25	4	0	0	0	0	50	2	25	4	0	0	100	2	50	3	0	0
42	Ionia—*S. V. R.*	4	----	----	0	0	0	0	0	0	25	5	100	4	25	5	0	0	75	3	25	4	0	0	100	1	100	2	0	0
43	Ithaca—I. N. M.	4	----	----	----	----	----	----	50	3	----	----	----	----	----	----	100	2	100	2	----	----	----	----	50	3	----	----	----	----
44	Lansing—*J. H. W.*	4	----	----	100	5	0	0	100	2	100	3	100	6	0	0	25	3	100	1	75	3	50	6	100	2	100	1	100	2
45	Muir—L. S. S.	4	0	0	0	0	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	25	5	100	1	50	4	0	0
46	North Lansing—O. M.	4	50	4	25	3	0	0	25	3	25	3	100	3	0	0	75	1	100	3	75	4	0	0	100	2	0	0	100	4
47	Otisville—A. W. N.	4	----	----	100	2	0	0	0	0	0	0	100	3	0	0	25	4	75	2	25	3	0	0	100	2	0	0	0	0
48	Ovid—O. B. C.	4	0	0	25	4	0	0	25	2	0	0	0	0	0	0	0	0	0	0	0	0	25	3	25	3	25	2	50	1
49	Vernon—D. C. H.	4	0	0	0	0	0	0	100	3	100	3	25	6	0	0	0	0	100	2	0	0	0	0	100	1	100	2	0	0
50	Webberville—R. B. S.	4	----	----	25	2	0	0	25	4	0	0	100	4	0	0	100	1	50	4	0	0	25	3	100	2	50	4	25	3
51	SOUTH-WESTERN DIV.†	*38*	----	----	*80*	*6*	*25*	*4*	*54*	*5*	*58*	*4*	*93*	*6*	*25*	*4*	*65*	*4*	*84*	*4*	*55*	*4*	*33*	*4*	*97*	*2*	*94*	*2*	*38*	*11*
52	Allegan—W. H. B.	4	0	0	----	----	0	0	50	5	50	5	75	6	0	0	25	5	75	3	25	4	0	0	100	1	100	2	0	0
53	Cassopolis—F. G.	4	25	4	25	4	----	----	25	4	----	----	100	5	25	4	100	3	75	3	----	----	----	----	100	1	----	----	----	----
54	Dayton—W. A. N.	4	0	0	100	5	0	0	25	8	50	7	0	0	0	0	100	7	100	4	100	4	0	0	100	2	100	2	0	0
55	Dowagiac—*E. C. P.*	2	----	----	0	0	0	0	0	0	100	3	0	0	0	0	0	0	100	3	0	0	0	0	100	1	0	0	0	0
56	Mattawan—T. H. B.	4	----	----	75	4	0	0	75	4	25	6	75	6	25	4	0	0	75	4	0	0	50	5	75	3	100	2	0	0
57	Niles—J. S. R.	4	----	----	100	9	0	0	0	0	0	0	100	7	0	0	0	0	100	5	0	0	0	0	100	4	100	2	50	11
58	Niles—*I. S.*	4	----	----	100	8	----	----	50	9	75	6	100	9	----	----	----	----	100	7	----	----	----	----	100	1	100	2	25	11
59	Otsego—M. C.	4	----	----	0	0	25	4	0	0	0	0	100	4	0	0	75	3	50	3	25	4	25	4	100	1	50	2	0	0
60	Paw Paw—J. A.	4	----	----	0	0	0	0	0	0	25	2	100	3	0	0	25	4	75	2	25	4	25	3	100	2	100	2	0	0
61	St. Joseph—R. F. S.	4	----	----	0	0	0	0	100	2	100	2	0	0	0	0	0	0	100	2	100	2	0	0	100	1	100	1	0	0
62	SOUTH'N-CENTRAL DIV.†	*72*	----	----	*85*	*4*	*0*	*0*	*47*	*7*	*67*	*5*	*92*	*6*	*25*	*9*	*56*	*7*	*91*	*3*	*53*	*5*	*55*	*7*	*99*	*1*	*87*	*2*	*67*	*6*
63	Adrian—*A. M. S.*	4	----	----	100	3	0	0	25	4	25	2	50	3	0	0	0	0	75	3	25	3	0	0	100	1	0	0	0	0
64	Albion—J. P. S.	4	----	----	100	6	0	0	50	9	100	7	100	8	0	0	0	0	100	6	50	7	100	11	100	2	100	3	0	0
65	Battle Creek—*S. S. F.**	4	----	----	----	----	----	----	100	4	100	4	100	8	----	----	----	----	100	2	----	----	----	----	100	2	100	4	100	7
66	Brooklyn—E. N. P.	4	----	----	----	----	0	0	0	0	----	----	0	0	0	0	0	0	75	3	25	5	0	0	75	1	75	3	0	0
67	Centreville—M. S.	4	0	0	100	3	0	0	0	0	100	4	0	0	0	0	0	0	100	4	25	3	25	4	100	1	100	2	0	0
68	Clinton—A. W. A.	4	0	0	0	0	0	0	50	9	50	6	100	8	0	0	0	0	100	3	0	0	25	8	100	1	100	2	0	0
69	Coldwater—*G. V. V.*	4	----	----	50	4	0	0	25	7	0	0	100	7	0	0	75	8	100	2	0	0	0	0	100	1	25	1	0	0
70	Hillsdale—*J. W. F.**	4	25	6	50	6	0	0	50	6	50	6	0	0	0	0	0	0	100	4	75	6	100	5	100	1	100	2	25	5
71	Jackson (Prison)—E. L. K.	4	----	----	100	1	----	----	----	----	75	6	100	4	----	----	----	----	100	5	25	5	----	----	100	3	----	----	75	6
72	Jackson—W. W.	4	----	----	75	3	0	0	0	0	0	0	100	4	25	9	100	7	75	3	0	0	0	0	100	3	100	1	0	0
73	Kalamazoo—W. B. S.	4	0	0	0	0	0	0	0	0	0	0	100	5	0	0	0	0	100	4	0	0	0	0	100	1	100	2	0	0
74	Marshall—H. L. J.	4	----	----	0	0	0	0	0	0	50	3	0	0	0	0	0	0	75	3	0	0	0	0	100	2	100	3	0	0
75	Mendon—H. C. C.	4	----	----	100	6	0	0	0	0	100	4	100	7	0	0	25	8	100	3	100	6	25	8	100	1	100	2	0	0
76	Mendon—E. S.	4	----	----	0	0	0	0	0	0	25	3	0	0	----	----	25	4	75	3	0	0	0	0	100	1	100	2	0	0
77	Sturgis—N. I. P.	4	----	----	0	0	0	0	25	4	25	2	100	4	0	0	0	0	75	3	0	0	0	0	100	1	50	2	0	0
78	Three Rivers—C. W. B.	4	----	----	100	4	0	0	50	9	100	10	100	9	0	0	0	0	100	3	0	0	0	0	100	1	100	4	0	0
79	Union City—N. H. C.	4	0	0	75	1	0	0	0	0	0	0	0	0	0	0	0	0	100	3	100	3	0	0	100	1	0	0	0	0
80	Ypsilanti—*E. B.**	4	0	0	0	0	0	0	0	0	0	0	50	4	0	0	0	0	0	0	0	0	0	0	100	1	50	3	0	0
81	SOUTH-EASTERN DIV.†	*44*	----	----	*91*	*4*	*0*	*0*	*63*	*11*	*63*	*9*	*100*	*6*	*0*	*0*	*63*	*9*	*84*	*4*	*72*	*7*	*88*	*13*	*100*	*2*	*92*	*3*	*67*	*7*
82	Detroit—L. C.	4	---	---	100	2	0	0	100	11	50	15	100	6	0	0	100	15	100	5	100	13	100	17	100	2	100	7	0	0
83	Detroit—*E. L.*	4	100	12	100	7	0	0	75	7	50	7	100	10	0	0	100	9	100	3	100	3	100	10	100	1	100	2	100	10
84	Detroit—W. H. R.	4	100	16	100	5	0	0	25	19	100	15	100	7	0	0	100	13	100	9	100	16	100	17	100	3	100	4	100	15
85	Milford—R. J.	4	----	----	100	2	0	0	0	0	0	0	100	5	0	0	25	5	25	4	50	4	0	0	100	1	0	0	75	5
86	Monroe—*A. J. M.*	4	----	----	0	0	0	0	0	0	75	4	100	6	0	0	0	0	100	2	0	0	0	0	100	1	50	2	0	0
87	Northville—J. M. S.	4	----	----	0	0	0	0	0	0	----	----	100	4	0	0	25	4	50	4	25	5	0	0	100	1	100	2	25	4
88	Trenton—W. C.	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	8	75	6	0	0	50	8	100	2	100	1	0	0
89	Utica—G. G. R.	4	----	----	50	4	0	0	50	5	50	4	100	6	0	0	0	0	100	3	75	6	0	0	100	1	100	2	50	5
90	Washington—A. Y.	4	----	----	100	3	0	0	0	0	50	6	100	4	0	0	0	0	100	3	100	3	0	0	100	5	0	0	0	0
91	Wyandotte—E. P. C.	4	----	----	100	3	0	0	0	0	0	0	100	3	0	0	0	0	75	3	25	2	0	0	100	2	75	1	50	2
92	Wyandotte—*T. J. L.*	4	----	----	75	4	0	0	0	0	0	0	100	7	0	0	0	0	100	3	0	0	0	0	100	1	100	2	0	0

* †, ‡, §, ||, For explanations and references, see foot-notes on pages 390-1.

TABLE 3.—*Diseases, by Localities in Michigan, Four Weeks ending* **September** *27, 1879*—CONTINUED.

Line Number. ¶	Fever, Typho-Malarial.		Influenza.		Measles.		Neuralgia.		Pneumonia.		Puerperal Fever.		Rheumatism.		Scarlatina.		Small-pox.		Tonsillitis.		Whooping-Cough.	
	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§
1	73	4.7	68	3.8	67	7.3	81	5.0	54	6.3	46	6.0	84	5.2	58	6.3	0	0	60	5.4	79	5.0
2	*100*	*2*	*75*	*2*	*0*	*0*	*100*	*4*	*25*	*5*	*0*	*0*	*75*	*4*	*42*	*4*	*0*	*0*	*67*	*3*	*75*	*3*
3	0	0	75	3	0	0	0	0	25	6	0	0	25	5	25	5	0	0	75	5	0	0
4	0	0	75	1	0	0	100	4	0	0	0	0	100	5	50	5	0	0	100	3	0	0
5	100	2	75	2	0	0	100	3	25	4	0	0	100	3	50	3	0	0	25	2	75	3
6	*100*	*2*	*0*	*0*	*0*	*0*	*75*	*3*	*25*	*3*	*0*	*0*	*100*	*4*	*0*	*0*	*0*	*0*	*25*	*5*	*0*	*0*
7	0	0	0	0	0	0	100	4	0	0	0	0	100	4	0	0	0	0	25	5	0	0
8	100	2	0	0	0	0	50	2	25	3	0	0	0	0	0	0	0	0	0	0	0	0
9	*0*	*0*	*75*	*3*	*0*	*0*	*75*	*3*	*0*	*0*	*0*	*0*	*100*	*3*	*75*	*4*	*0*	*0*	*100*	*4*	*0*	*0*
10	0	0	75	3	0	0	75	3	0	0	0	0	100	3	75	4	0	0	100	4	0	0
11	*80*	*8*	*53*	*5*	*67*	*5*	*83*	*6*	*42*	*5*	*38*	*7*	*79*	*7*	*55*	*9*	*0*	*0*	*63*	*6*	*83*	*7*
12	100	3	25	5	50	6	50	7	0	0	0	0	100	8	75	9	0	0	0	0	100	7
13	0	0	0	0	50	2	100	5	0	0	50	6	75	5	0	0	0	0	25	5	50	1
14	0	0	25	2	0	0	75	4	50	4	0	0	25	6	0	0	0	0	50	7	0	0
15	100	5	67	8	100	4	67	6	0	0	0	0	100	4	67	7	----	----	33	5	----	----
16	25	7	100	3	75	6	100	6	50	7	25	7	0	0	0	0	0	0	100	4	0	0
17	100	15	0	0	0	0	100	5	25	5	0	0	100	10	25	12	0	0	100	8	100	12
18	*50*	*4*	*0*	*0*	*0*	*0*	*75*	*4*	*0*	*0*	*0*	*0*	*75*	*3*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*
19	50	4	0	0	0	0	75	4	0	0	0	0	75	3	0	0	0	0	0	0	0	0
20	*78*	*5*	*65*	*5*	*100*	*4*	*89*	*6*	*54*	*6*	*25*	*8*	*87*	*5*	*63*	*6*	*0*	*0*	*63*	*6*	*65*	*4*
21	100	10	100	2	0	0	100	12	25	13	0	0	100	5	0	0	0	0	----	----	0	0
22	0	0	0	0	0	0	----	----	100	7	0	0	100	7	0	0	0	0	----	----	25	7
23	----	----	----	----	----	----	----	----	50	2	----	----	50	3	----	----	----	----	----	----	----	----
24	50	5	25	5	0	0	75	7	25	4	25	9	75	5	75	5	0	0	----	----	0	0
25	25	6	0	0	0	0	75	5	0	0	25	7	50	7	50	6	0	0	50	8	0	0
26	100	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
27	75	8	75	8	0	0	100	5	25	9	0	0	100	7	0	0	0	0	50	10	0	0
28	75	5	0	0	0	0	100	2	0	0	0	0	100	4	0	0	0	0	100	4	75	4
29	50	4	0	0	0	0	----	----	0	0	0	0	0	0	0	0	0	0	----	----	100	1
30	100	3	25	4	0	0	100	6	0	0	0	0	100	6	0	0	0	0	0	0	0	0
31	100	3	0	0	0	0	75	3	75	3	0	0	75	3	0	0	0	0	50	3	75	2
32	100	4	100	5	100	4	----	----	75	5	0	0	100	6	0	0	0	0	----	----	50	5
33	*79*	*4*	*75*	*5*	*25*	*12*	*86*	*5*	*65*	*7*	*25*	*2*	*84*	*6*	*42*	*5*	*0*	*0*	*58*	*5*	*79*	*4*
34	100	10	100	3	25	12	100	10	75	12	0	0	100	9	0	0	0	0	100	8	100	7
35	0	0	75	9	0	0	100	8	0	0	0	0	75	10	0	0	0	0	25	10	0	0
36	100	7	100	7	0	0	100	9	100	10	0	0	100	9	0	0	0	0	0	0	0	0
37	0	0	0	0	0	0	100	5	0	0	0	0	100	4	0	0	0	0	100	4	100	5
38	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
39	0	0	0	0	0	0	0	0	25	5	0	0	0	0	0	0	0	0	0	0	0	0

	DISEASES REPORTED, WHICH WERE NOT PRINTED ON THE BLANKS, AMOUNT OF SICKNESS, ETC. ¶	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§
3	Chronic Bright's disease	75	6
	Pleuritis	25	6
10	Dyspepsia, nerv.	25	6
	Endometritis, conjunctivitis, and chorea, each	25	4
13	Dyspepsia	25	3
15	Inflammation of brain	33	7
21	Pharyngitis	100	9
22	Very healthy.		
25	Scarcely any sickness—only slight malaria; at Sarnia, across the water, they have been having quite an epidemic of typhoid fever, due to bad water; also, at St. Clair, below us.—Sept. 27.		
27	Dyspepsia	50	3
	Not much sickness, week ending Sept. 27.		
28	Sickness abating a little, Sept. 6.		
29	Peritonitis	50	5
31	Malarial diseases severe and obstinate, Sept. 13.		
32	Quite a number of persons are affected with the so-called "hay-fever," Sept. 6. There are some cases of remittent fever, which some of the doctors call typho-malarial fever, though they lack the essential characteristics, Sept. 13.		
37	Dropsy	100	5
	Ophthalmia	50	5
	Anæmia	75	5
	Lumbago	25	5
38	Cystitis	50	6
	Peritonitis	25	5
40	Pemphigus	25	11
	Pharyngitis	25	5
41	Angina simplex	25	1
49	Whooping-cough limited to two or three families; diseases unusually mild generally this season, Sept. 13.		
56	Myelitis	25	6
	Cystitis	25	5
	Cancer of stomach and eclampsia, each	25	7

40	0	0	0	0	0	0	0	0	0	0	0	0	100	6	0	0	0	0	0	0	100	2
41	0	0	0	0	0	0	100	1	0	0	0	0	75	3	0	0	0	0	100	2	0	0
42	0	0	0	0	0	0	----	----	0	0	0	0	0	0	50	5	0	0	----	----	0	0
43	----	----	----	----	----	----	25	3	----	----	25	2	75	2	----	----	----	----	50	3	----	----
44	100	1	50	4	0	0	100	4	0	0	0	0	100	5	25	7	0	0	75	6	0	0
45	75	4	75	3	0	0	0	0	0	0	0	0	50	4	0	0	0	0	0	0	100	2
46	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	4
47	0	0	0	0	0	0	50	3	0	0	0	0	50	4	50	3	0	0	0	0	0	0
48	25	1	50	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	2	0	0
49	0	0	0	0	0	0	100	4	25	6	0	0	100	5	0	0	0	0	25	5	75	6
50	75	3	0	0	0	0	0	0	100	4	0	0	0	0	0	0	0	0	25	4	25	2
51	*46*	*4*	*67*	*4*	*0*	*0*	*79*	*5*	*63*	*6*	*0*	*0*	*82*	*5*	*50*	*7*	*0*	*0*	*65*	*5*	*63*	*5*
52	0	0	0	0	0	0	25	3	75	6	0	0	0	0	50	6	0	0	0	0	25	7
53	25	4	100	3	----	----	75	5	100	5	----	----	75	4	----	----	----	----	25	4	----	----
54	0	0	100	4	0	0	75	6	0	0	0	0	100	7	0	0	0	0	100	6	0	0
55	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
56	25	2	75	2	0	0	100	3	0	0	0	0	75	5	----	----	----	----	50	1	----	----
57	100	1	50	5	0	0	100	7	50	9	0	0	100	6	----	----	----	----	100	9	----	----
58	50	8	----	----	----	----	100	5	----	----	----	----	50	5	50	8	----	----	----	----	100	3
59	0	0	0	0	0	0	0	0	0	0	0	0	100	3	0	0	0	0	0	0	0	0
60	50	3	25	4	0	0	75	3	25	3	0	0	75	3	0	0	0	0	50	4	0	0
61	25	3	50	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
62	*72*	*5*	*69*	*4*	*0*	*0*	*84*	*5*	*38*	*5*	*75*	*6*	*84*	*5*	*63*	*6*	*0*	*0*	*47*	*6*	*88*	*5*
63	0	0	0	0	0	0	0	0	75	3	0	0	100	3	0	0	0	0	0	0	0	0
64	0	0	100	2	0	0	100	7	25	5	0	0	100	8	0	0	0	0	25	13	0	0
65	----	----	25	7	----	----	----	----	----	----	----	----	50	8	----	----	----	----	----	----	----	----
66	0	0	0	0	0	0	0	0	0	0	0	0	0	0	50	5	0	0	0	0	75	4
67	75	4	100	4	0	0	100	5	25	5	0	0	50	4	0	0	0	0	100	4	0	0
68	100	8	0	0	0	0	100	5	25	4	0	0	75	5	0	0	0	0	0	0	50	5
69	0	0	0	0	0	0	100	3	0	0	0	0	100	4	0	0	0	0	25	5	100	5
70	100	3	25	6	0	0	100	5	0	0	0	0	100	5	0	0	0	0	50	5	100	5
71	----	----	----	----	----	----	----	----	50	6	----	----	100	3	----	----	----	----	25	4	----	----
72	100	5	50	3	0	0	0	0	0	0	0	0	75	7	75	6	0	0	25	6	0	0
73	100	3	0	0	0	0	0	0	----	----	75	6	0	0	0	0	0	0	0	0	0	0
74	25	6	0	0	0	0	50	5	0	0	0	0	100	5	0	0	0	0	0	0	0	0
75	0	0	0	0	0	0	50	5	25	8	0	0	100	7	0	0	0	0	25	8	0	0
76	0	0	75	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	4	0	0
77	75	4	0	0	0	0	25	4	0	0	0	0	25	4	0	0	0	0	0	0	0	0
78	0	0	100	3	0	0	100	6	0	0	0	0	100	7	0	0	0	0	----	----	100	8
79	50	6	0	0	0	0	100	3	0	0	0	0	100	4	0	0	0	0	0	0	100	2
80	25	2	75	2	0	0	100	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
81	*75*	*5*	*67*	*3*	*70*	*9*	*67*	*6*	*75*	*8*	*100*	*5*	*85*	*5*	*81*	*7*	*0*	*0*	*64*	*6*	*100*	*11*
82	100	9	50	3	100	14	100	7	100	17	0	0	100	7	100	12	0	0	100	10	100	10
83	100	9	100	5	100	8	100	5	100	9	0	0	100	6	100	7	0	0	100	10	100	11
84	0	0	100	1	50	18	100	11	100	9	0	0	100	10	100	6	0	0	100	2	0	0
85	50	4	75	3	0	0	0	0	50	5	0	0	25	5	0	0	0	0	0	0	0	0
86	0	0	0	0	0	0	25	4	75	4	0	0	100	6	25	4	0	0	0	0	0	0
87	50	3	50	3	0	0	25	5	0	0	0	0	100	4	0	0	0	0	25	5	0	0
88	100	3	0	0	0	0	100	6	0	0	100	5	100	5	0	0	0	0	0	0	0	0
89	100	3	0	0	0	0	25	8	0	0	0	0	0	0	0	0	0	0	25	7	0	0
90	0	0	0	0	50	2	100	4	25	6	0	0	100	2	0	0	0	0	75	5	0	0
91	50	2	0	0	0	0	25	2	0	0	0	0	25	1	0	0	0	0	25	4	0	0
92	50	7	25	5	50	4	----	----	0	0	0	0	100	6	0	0	0	0	----	----	0	0

60	Locomotor ataxy, diuresis, amenorrhea, myelitis, Pott's disease, and gonorrhea, each	25	3
	Bilious colic and spinal irritation, each	50	4
	Sciatica	50	3
	Nephritis and dyspepsia, each	25	4
63	Hay asthma	75	2
64	Not much acute disease, Sept. 13.		
65	One death from Bright's disease.		
68	Health of our community excellent, Sept. 25.		
70	Pertussis	25	6
	Inflammation of brain	50	6
71	Syphilis	25	6
72	Sickness light since rain, Sept. 6. Sickness increased alarmingly with us whilst that hot dry weather continued; fever of the different forms reported constituted the bulk of the business doing; the remittent and typho-malarial fevers show a still greater cerebral type than last year; persistent heat, etc., with other head symptoms, with cold extremities, and shortened exacerbations of bodily surface heat is the general aspect of the cases, Sept. 10.		
75	Pelvic cellulitis	25	7
	Pharyngitis	25	2
76	Influenza marked hay fever, Sept. 6 and 13. Hay asthma, year by year, is becoming more prevalent and rag-weed is becoming more abundant; horses have been having a pulmonary distemper which is now subsiding, as it is also in man; the disease has not been severe in either, Sept. 15.		
78	Gastritis	25	11
	Not much sickness.		
80	No settled form of disease prevailing, Sept. 13.		
83	Inflammation of brain	100	12
	Mumps	25	11
84	Inflammation of brain	100	13
	Influenza (so-called diphtheria) does not yield so readily to treatment as last winter, Sept. 6. Influenza becoming common, type rather severe, Sept 13. Healthy.		
86	Painfully healthy, Sept. 13.		
87	Healthy, Sept. 6. "Fever and ague" severe, remittent quite severe, tendency to continued or typhoid types, Sept. 13. Influenza marked hay fever, two weeks ending Sept. 27.		
90	Dyspepsia	100	1
	Malaria	100	3
	Hysteria	25	5
	Scrofulosis	25	2
	Enteritis	25	4

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‡, § For explanations and references, see pages 390-1. ☞ See "additional notes" for September, pages 431 and 434-5.

¶ The several numbered lines on these two pages continue statements for the localities and divisions which are named and have the same line-numbers on the two preceding pages. On the right side of the page the numbers before the side-notes are the line-numbers of the localities on pages 418-9, to which the side-notes refer.

TABLE 3.—CONTINUED.—*Diseases, by Localities in Michigan*, **October**, *1879, (Five Weeks ending November 1).*

Line Number.	Divisions and Localities Represented, and Initials of Physicians who Reported.* (Health Officers in italics; those also Correspondents marked with a *.)	Reports Received.	Brain, Inflammat'n of.		Bowels, Inflammat'n of.		Bronchitis.		Cerebro-Spinal Men'gitis.		Cholera Infantum.		Cholera Morbus.		Consumption, Pulmonary.		Croup, Membraneous.		Diphtheria.		Diarrhea.		Dysentery.		Erysipelas.		Fever, Intermittent.		Fever, Remittent.	
			Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§
1	ALL LOCALITIES ‖	381	----	----	----	----	79	4.0	40	4.8	45	4.8	39	5.5	88	5.4	30	6.6	59	5.0	67	3.9	50	6.1	54	7.2	97	1.6	82	2.6
2	UPPER PENIN. DIV.†	*14*	----	..	----	----	*100*	*2*	*60*	*6*	*20*	*3*	*20*	*1*	*100*	*3*	*0*	*0*	*0*	*0*	*93*	*3*	*0*	*0*	*0*	*0*	*0*	*0*	*50*	*5*
3	Houghton—H. W. J.	5	0	0	0	0	0	0	0	0	20	3	20	1	100	1	0	0	0	0	80	2	0	0	0	0	0	0	0	0
4	Ishpeming—*W. T. C.* *	4	0	0	0	0	100	2	0	0	0	0	0	0	100	4	0	0	0	0	100	2	0	0	0	0	0	0	50	5
5	Marquette—*G. J. N.* *	5	----	----	----	----	100	2	60	6	0	0	0	0	100	4	0	0	0	0	100	4	0	0	0	0	0	0	0	0
6	NORTH-WESTERN DIV.†	*10*	----	----	----	----	*100*	*4*	*0*	*0*	*0*	*0*	*40*	*3*	*20*	*5*	*0*	*0*	*20*	*2*	*50*	*3*	*20*	*3*	*0*	*0*	*100*	*4*	*0*	*0*
7	Cadillac—C. E. M.	5	0	0	0	0	100	4	0	0	0	0	20	5	20	5	0	0	0	0	60	4	20	3	0	0	100	4	0	0
8	Cadillac—*J. M. W.*	5	----	----	----	----	0	0	0	0	0	0	60	1	0	0	0	0	20	2	40	1	0	0	0	0	0	0	0	0
9	NORTH-EASTERN DIV.†	*4*	----	----	----	----	*75*	*4*	*0*	*0*	*50*	*3*	*0*	*0*	*0*	*0*	----	----	*50*	*3*	*100*	*3*	*75*	*4*	*25*	*6*	*75*	*4*	*75*	*1*
10	Alpena—W. P. M.	4	----	----	----	----	75	4	0	0	50	3	0	0	0	0	----	----	50	3	100	3	75	4	25	6	75	4	75	1
11	WESTERN DIVISION†	*28*	----	----	----	----	*74*	*6*	*40*	*5*	*63*	*8*	*52*	*7*	*83*	*7*	*50*	*8*	*91*	*4*	*78*	*5*	*61*	*8*	*77*	*10*	*93*	*2*	*96*	*2*
12	Cedar Springs—C. S. F.	5	0	0	0	0	60	7	0	0	0	0	20	7	0	0	20	6	60	7	40	6	0	0	60	7	100	1	100	2
13	Drenthe—H. K.	5	0	0	0	0	40	4	40	5	40	5	0	0	40	4	0	0	0	0	80	4	0	0	0	0	100	2	80	4
14	Grand Haven—A. V.	5	----	----	----	----	80	4	----	----	----	----	20	4	----	----	----	----	100	4	----	----	20	7	----	----	60	1	100	2
15	Grand Rapids—*L. D. P.*	3	67	10	100	11	100	7	0	0	100	19	100	9	100	8	100	10	100	2	100	6	100	11	100	9	100	2	100	3
16	Grand Rapids—A. H.	5	0	0	0	0	0	0	0	0	0	0	40	7	100	5	0	0	100	4	0	0	40	5	0	0	100	2	100	1
17	Muskegon—*O. C. W.*	5	----	----	----	----	100	10	0	0	0	0	100	8	100	12	0	0	100	3	100	4	100	10	80	15	100	1	100	2
18	NORTH'N-CENTR'L DIV.†	*5*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*20*	*6*	*0*	*0*	*80*	*4*	*60*	*4*	*0*	*0*	*40*	*5*	*100*	*1*	*40*	*4*
19	Big Rapids—*I. W. B.*	5	20	5	0	0	0	0	0	0	0	0	0	0	20	6	0	0	80	4	60	4	0	0	40	5	100	1	40	4
20	BAY-AND-EAST'N DIV.†	*56*	----	----	----	----	*95*	*4*	*40*	*7*	*25*	*4*	*43*	*6*	*93*	*5*	*30*	*8*	*61*	*4*	*52*	*4*	*30*	*4*	*38*	*6*	100	*1*	*76*	*2*
21	Bay City—W. R. M.	5	----	----	----	----	100	3	40	7	0	0	0	0	100	5	0	0	80	6	60	5	0	0	0	0	100	1	100	3
22	Lapeer—*H. McC.*	4	----	----	----	----	75	3	----	----	----	----	----	----	----	----	----	----	100	3	25	3	----	----	25	4	100	1	100	2
23	Lapeer—I. H. T.	3	----	----	----	----	67	3	0	0	33	4	----	----	100	5	----	----	100	2	100	3	0	0	0	0	100	1	67	1
24	Port Huron—*E. P. T.*	5	----	----	----	----	0	0	0	0	0	0	0	0	0	0	0	0	20	4	20	2	0	0	0	0	100	1	20	2
25	Port Huron—A. A. W.	5	0	0	0	0	100	2	0	0	0	0	0	0	100	6	0	0	0	0	20	6	0	0	0	0	100	1	80	3
26	Port Sanilac—J. M. L.	5	----	----	----	----	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	2	20	3	40	3	100	2	0	0
27	Saginaw City—*E. A. H.*	5	----	----	----	----	100	9	0	0	0	0	0	0	80	8	20	10	60	3	40	7	0	0	20	9	100	1	80	4
28	Saginaw City—N. D. L.	5	0	0	100	4	100	4	0	0	20	4	60	6	100	5	40	6	80	5	80	4	60	5	80	6	100	1	0	0
29	St. Clair—*C. G. R.*	5	----	----	----	----	0	0	0	0	0	0	0	0	100	4	0	0	0	0	60	3	20	3	0	0	100	1	60	2
30	Thornville—J. S. C.	5	0	0	0	0	100	3	0	0	0	0	0	0	80	6	0	0	0	0	60	2	20	5	20	6	100	1	0	0
31	W. Bay City—J. W. H.	4	----	----	----	----	100	3	0	0	0	0	25	5	75	5	0	0	25	6	0	0	0	0	0	0	100	2	75	1
32	W. Bay City—*I. E. R.* *	5	----	----	----	----	100	5	0	0	0	0	40	6	100	4	0	0	40	6	60	6	0	0	0	0	100	2	100	3
33	CENTRAL DIVISION†	*84*	----	----	----	----	*76*	*4*	*20*	*1*	*59*	*5*	*38*	*5*	*83*	*6*	*0*	*0*	*49*	*6*	*81*	*3*	*66*	*6*	*60*	*6*	*96*	*2*	*83*	*2*
34	Charlotte—G. B. A.	4	50	12	50	13	100	3	0	0	50	12	50	7	100	14	0	0	25	15	100	4	25	7	0	0	100	2	100	6
35	Charlotte—*P. D. P.*	5	0	0	0	0	100	7	0	0	100	5	100	5	40	8	0	0	20	10	100	3	100	7	0	0	100	2	100	1
36	Corunna—*A. G. B.*	5	----	----	20	14	80	12	0	0	0	0	20	4	100	10	----	----	80	5	100	6	80	8	100	10	100	2	100	1
37	DeWitt—G. W. T.	5	0	0	0	0	100	2	0	0	0	0	0	0	100	6	0	0	0	0	100	1	60	5	60	5	100	3	100	4
38	Elsie—E. V. C.	5	----	----	20	5	0	0	0	0	80	2	0	0	0	0	0	0	0	0	60	3	0	0	0	0	80	2	100	1
39	Hastings—A. P. D.	5	0	0	0	0	0	0	20	1	0	0	0	0	100	2	0	0	0	0	0	0	0	0	0	0	100	1	0	0
40	Hubbardston—H. W. B.	5	0	0	0	0	0	0	0	0	0	0	0	0	100	8	0	0	0	0	100	5	0	0	0	0	100	2	0	0

41	Ionia, H. of C.—W. F. R.	5	20	5	40	3	20	3	0	0	0	0	0	0	40	4	0	0	0	0	80	2	80	3	0	0	100	2	0	0
42	Ionia—*S. V. R.*	5	0	0	0	0	0	0	0	0	0	0	0	0	100	5	0	0	0	0	0	0	0	0	20	4	100	1	100	2
43	Ithaca—I. N. M.	5	----	----	----	----	----	----	----	----	20	3	----	----	----	----	----	----	40	2	60	1	----	----	60	3	80	2	20	3
44	Lansing—*J. H. W.*	5	----	----	----	----	100	7	0	0	80	5	20	4	100	6	0	0	100	3	60	3	0	0	0	0	100	3	100	3
45	Muir—L. S. S.	5	0	0	0	0	60	5	0	0	0	0	0	0	60	6	0	0	0	0	0	0	0	0	0	0	100	1	100	4
46	North Lansing—O. M.	5	----	----	60	3	40	4	0	0	20	4	20	5	100	3	0	0	60	3	100	3	40	4	0	0	100	1	0	0
47	Otisville—A. W. N.	5	0	0	0	0	100	1	0	0	0	0	0	0	100	2	0	0	0	0	0	0	0	0	0	0	0	0	20	3
48	Ovid—O. B. C.	5	0	0	0	0	100	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	1
49	Vernon—D. C. H.	5	0	0	0	0	80	4	0	0	0	0	20	4	0	0	0	0	20	5	80	3	0	0	0	0	100	1	100	2
50	Webberville—R. B. S.	5	0	0	0	0	40	2	0	0	0	0	0	0	40	3	0	0	40	2	40	2	0	0	0	0	80	2	40	1
51	South-Western Div.†	*40*	----	----	----	----	*65*	4	*0*	*0*	*40*	*3*	*30*	*3*	*80*	*5*	*30*	*5*	*57*	*5*	*60*	*4*	*27*	*5*	*20*	*4*	*100*	*2*	*91*	*2*
52	Allegan—W. H. B.	5	0	0	0	0	80	5	0	0	0	0	0	0	60	5	0	0	20	7	20	4	20	6	0	0	100	1	100	3
53	Cassopolis—F. G.	5	----	----	----	----	20	4	----	----	----	----	----	----	40	4	20	6	80	1	40	5	20	5	----	----	100	2	----	----
54	Dayton—W. A. N. & R. H.	5	----	----	20	4	100	5	0	0	0	0	0	0	0	0	0	0	80	5	80	3	20	4	20	3	100	1	100	2
55	Niles—J. S. R.	5	20	12	0	0	100	7	0	0	0	0	0	0	100	7	0	0	20	11	100	6	20	8	0	0	100	4	100	2
56	Niles—*I. S.*	5	----	----	----	----	100	6	----	----	----	----	----	----	100	8	----	----	----	----	60	7	----	----	----	----	100	1	100	2
57	Otsego—M. C.	5	0	0	0	0	20	3	0	0	0	0	0	0	100	4	0	0	100	3	40	5	0	0	0	0	100	1	40	3
58	Paw Paw—J. A.	5	----	----	----	----	40	3	0	0	0	0	20	3	100	3	40	4	40	3	100	2	40	3	20	4	100	1	100	2
59	St. Joseph—R. F. S.	5	----	----	----	----	60	2	0	0	40	3	40	2	60	3	0	0	60	3	40	2	40	2	0	0	100	1	100	1
60	South'n-Centr'l Div.†	*87*	----	----	----	----	*72*	*3*	*40*	*5*	*20*	*5*	*35*	*6*	*94*	*5*	*20*	*8*	*53*	*6*	*63*	*4*	*46*	*6*	*57*	*7*	*98*	*7*	*73*	*3*
61	Adrian—*A. M. S.*	5	----	----	----	----	40	3	0	0	0	0	40	2	80	3	0	0	20	3	20	3	0	0	0	0	100	1	100	3
62	Albion—J. P. S. & A. M. D.	4	----	----	----	----	100	4	0	0	0	0	75	11	100	8	0	0	0	0	100	7	75	8	100	10	100	4	100	5
63	Battle Creek—S. S. F.*	5	----	----	----	----	----	----	----	----	20	6	40	5	100	7	----	----	60	6	80	3	20	7	----	----	100	1	100	2
64	Brooklyn—E. N. P.	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	80	2	0	0	0	0	100	2	20	3
65	Centreville—M. S.	5	----	----	0	0	40	4	40	5	0	0	0	0	60	5	0	0	60	4	100	3	0	0	0	0	100	1	100	2
66	Clinton—A. W. A.	5	0	0	0	0	0	0	0	0	0	0	0	0	100	7	0	0	0	0	20	4	0	0	60	6	100	1	100	2
67	Coldwater—*G. V. V.*	5	0	0	0	0	100	2	0	0	0	0	0	0	100	8	0	0	0	0	100	5	0	0	0	6	100	1	20	8
68	Hillsdale—J. W. F.*	5	0	0	40	6	80	5	0	0	0	0	20	6	0	0	0	0	80	5	100	4	0	0	20	5	100	1	100	2
69	Jackson (*State P.*) E. L. K.	5	----	----	----	----	100	1	----	----	----	----	40	7	100	3	----	----	----	----	80	6	----	----	----	----	80	2	20	4
70	Jackson—W. W.	5	0	0	0	0	40	2	0	0	0	0	0	0	100	4	20	8	100	6	60	2	0	0	0	0	100	3	100	1
71	Kalamazoo—W. B. S.	5	0	0	0	0	0	0	0	0	0	0	0	0	100	4	0	0	0	0	0	0	0	0	0	0	100	1	100	2
72	Marshall—H. L. J.	5	----	----	----	----	20	2	0	0	0	0	0	0	0	0	0	0	20	5	20	4	0	0	0	0	80	1	40	2
73	Mendon—H. C. C.	5	0	0	0	0	100	3	0	0	0	0	0	0	100	4	0	0	20	5	20	3	20	6	0	0	100	1	100	2
74	Mendon—E. S.	5	20	3	0	0	80	2	0	0	0	0	0	0	0	0	0	0	0	0	20	3	0	0	0	0	100	1	60	2
75	Sturgis—N. I. P.	5	0	0	0	0	40	2	0	0	20	3	20	5	100	3	0	0	0	0	40	2	20	3	0	0	100	1	20	3
76	Three Rivers—C. W. B.	5	0	0	0	0	100	4	0	0	0	0	20	9	100	8	0	0	60	10	80	6	0	0	0	0	100	1	100	3
77	Union City—N. H. C.	5	0	0	0	0	100	3	0	0	0	0	0	0	80	5	0	0	0	0	100	3	100	4	0	0	100	1	0	0
78	Ypsilanti—E. B.*	3	----	----	----	----	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	1	0	0
79	South-Eastern Div.†	*53*	----	----	----	----	*90*	*4*	*0*	*0*	*0*	*0*	*40*	7	*98*	*5*	*20*	*5*	*60*	7	*69*	*5*	*72*	*10*	*75*	*11*	*92*	*2*	*93*	*3*
80	Detroit—L. C.	5	100	17	100	17	100	3	0	0	0	0	20	3	100	6	0	0	0	0	100	4	100	16	100	15	100	1	100	7
81	Detroit—*E. L.*	5	40	11	40	11	100	7	0	0	0	0	0	0	100	8	0	0	100	8	100	8	100	8	100	10	100	1	100	2
82	Detroit—W. H. R.	5	100	14	100	16	100	6	0	0	0	0	40	19	100	7	0	0	100	13	100	12	100	15	100	16	100	3	100	4
83	Milford—R. J.	5	----	----	----	----	100	2	----	----	----	----	----	----	100	4	----	----	---	----	40	4	----	----	----	----	100	1	----	----
84	Monroe—*A. J. M.*	5	0	0	20	10	0	0	0	0	0	0	80	3	100	6	0	0	0	0	60	3	40	5	0	0	0	0	100	1
85	Northville—J. M. S.	4	----	----	----	----	0	0	0	0	0	0	0	0	100	4	0	0	0	0	0	0	0	0	0	0	100	2	100	1
86	Trenton—W. C.	5	0	0	0	0	0	0	0	0	0	0	0	0	80	3	0	0	60	4	20	5	0	0	20	6	100	1	60	1
87	Utica—G. G. R.	4	0	0	25	5	100	5	0	0	0	0	0	0	100	7	0	0	0	0	25	3	0	0	50	6	25	1	75	1
88	Washington—A. Y.	5	----	----	40	6	100	4	0	0	0	0	0	0	100	4	20	5	20	5	80	4	20	5	0	0	100	5	100	5
89	Wyandotte—E. P. C.	5	----	----	20	4	80	3	0	0	0	0	20	3	100	2	20	4	20	4	100	3	0	0	0	0	80	3	0	0
90	Wyandotte—*T. J. L.*	5	----	----	----	----	40	5	0	0	0	0	0	0	100	7	0	0	60	6	60	5	0	0	0	0	100	2	100	3

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*, †, ‡, §, ‖. For explanations and references, see foot-notes on pages 390-1.

Oct. 7, 1879, Dr. N. D. Lee of Saginaw City, wrote: "I do not report cases outside of our city. I have just come in from a family, ten miles in the country, which has eight cases of typhoid-enteric and typho-malarial fever, all from the same cause, which is, I think, well-water poisoned by the barn. I can find no other apparent cause. I think two or three more are coming down with it in the same family."

TABLE 3.—CONTINUED.—*Diseases by Localities in Michigan*, **October**, *1879*, (*Five Weeks ending November 1.*)

Line Number. ¶	Fever, Typhoid (Enteric.)		Fever, Typho-Malarial.		Influenza.		Measles.		Neuralgia.		Pneumonia.		Puerperal Fever.		Rheumatism.		Scarlatina.		Small-pox.		Tonsilitis.		Whooping-Cough.	
	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.§	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§
1	68	6.1	71	4.5	72	4.0	87	6.8	75	4.1	59	6.3	45	5.6	79	4.6	62	5.9	0	0	59	4.7	65	5.6
2	*67*	*4*	*100*	*3*	*57*	*1*	*0*	*0*	*86*	*4*	*0*	*0*	*0*	*0*	*79*	*4*	*100*	*4*	*0*	*0*	*71*	*3*	*100*	*2*
3	100	3	0	0	20	2	0	0	60	4	0	0	0	0	40	5	100	4	0	0	20	4	----	----
4	25	5	0	0	50	1	0	0	100	4	0	0	0	0	100	4	100	4	0	0	100	4	0	0
5	0	0	100	3	100	1	0	0	100	5	0	0	0	0	100	4	100	3	0	0	100	2	100	2
6	*0*	*0*	*80*	*3*	*40*	*5*	*0*	*0*	*70*	*3*	*20*	*3*	*0*	*0*	*100*	*3*	*0*	*0*	*0*	*0*	*80*	*3*	*20*	*7*
7	0	0	60	5	40	5	0	0	100	3	0	0	0	0	100	3	0	0	0	0	100	5	20	7
8	0	0	100	1	0	0	0	0	40	2	20	3	0	0	0	0	0	0	0	0	60	1	0	0
9	*50*	*5*	*100*	*4*	*75*	*2*	*0*	*0*	*75*	*4*	----	----	*0*	*0*	*100*	*2*	*0*	*0*	*0*	*0*	*75*	*4*	*0*	*0*
10	50	5	100	4	75	2	0	0	75	4	----	----	0	0	100	2	0	0	0	0	75	4	0	0
11	*100*	*12*	*100*	*12*	*72*	*5*	*67*	*10*	*89*	*5*	*38*	*8*	*62*	*7*	*78*	*7*	*77*	*7*	*0*	*0*	*68*	*5*	*83*	*7*
12	0	0	0	0	80	5	0	0	80	6	0	0	0	0	100	6	40	5	0	0	20	3	80	7
13	0	0	0	0	0	0	0	0	80	3	0	0	20	4	80	4	0	0	0	0	80	4	100	1
14	----	----	----	----	20	3	----	----	100	4	40	5	----	----	20	8	----	----	----	----	60	7	----	----
15	100	12	100	12	100	9	67	10	100	6	67	13	67	11	100	4	100	11	0	0	100	5	33	9
16	0	0	0	0	100	4	0	0	80	5	20	6	100	6	0	0	100	5	0	0	60	5	0	0
17	100	11	100	12	0	0	0	0	100	5	0	0	0	0	100	11	0	0	0	0	100	5	100	10
18	*40*	*5*	*80*	*3*	*0*	*0*	*0*	*0*	*60*	*4*	*60*	*5*	*0*	*0*	*100*	*3*	*0*	*0*	*0*	*0*	*40*	*5*	*0*	*0*
19	40	5	20	3	0	0	0	0	60	4	60	5	0	0	100	3	0	0	0	0	40	5	0	0
20	*80*	*6*	*66*	*4*	*70*	*5*	*100*	*1*	*93*	*4*	*67*	*6*	*25*	*4*	*70*	*4*	*27*	*7*	*0*	*0*	*74*	*4*	*53*	*5*
21	0	0	0	0	100	4	0	0	100	6	80	7	0	0	100	7	0	0	0	0	100	4	80	7
22	----	----	25	4	----	----	----	----	----	----	----	----	----	----	50	5	----	----	----	----	25	5	----	----
23	0	0	0	0	0	0	0	0	67	4	0	0	0	0	33	3	0	0	0	0	67	2	0	0
24	0	0	0	0	0	0	0	0	100	3	0	0	0	0	40	3	40	5	0	0	----	----	20	3
25	0	0	40	6	0	0	0	0	100	4	20	7	0	0	100	5	20	5	0	0	0	0	0	0
26	----	----	20	1	0	0	0	0	0	0	0	0	0	0	20	1	0	0	0	0	0	0	0	0
27	60	6	100	4	80	8	0	0	100	5	40	10	0	0	100	5	20	10	0	0	60	5	0	0
28	100	5	60	4	0	0	0	0	100	2	0	0	0	0	100	3	0	0	0	0	100	4	0	0
29	0	0	0	0	0	0	0	0	----	----	0	0	0	0	60	4	0	0	0	0	----	----	20	5
30	0	0	80	2	20	3	0	0	100	4	0	0	0	0	100	5	0	0	0	0	0	0	0	0
31	0	0	100	2	0	0	0	0	75	4	100	3	25	4	100	3	0	0	0	0	75	4	100	3
32	0	0	100	5	80	6	100	1	80	4	100	5	0	0	20	6	0	0	0	0	80	5	0	0
33	*71*	*5*	*64*	*4*	*76*	*4*	*25*	*11*	*66*	*4*	*66*	*7*	*40*	*3*	*72*	*5*	*67*	*4*	*0*	*0*	*43*	*4*	*66*	*5*
34	0	0	100	9	100	4	25	11	100	9	50	14	0	0	100	6	0	0	0	0	100	7	50	9
35	0	0	0	0	100	7	0	0	100	8	0	0	0	0	80	10	0	0	0	0	0	0	0	0
36	100	9	100	6	100	7	0	0	100	7	100	10	0	0	100	10	0	0	0	0	0	0	0	0
37	60	6	0	0	0	0	0	0	100	4	0	0	0	0	100	4	0	0	0	0	100	3	0	0
38	0	0	40	4	0	0	0	0	20	4	0	0	0	0	20	5	0	0	0	0	40	5	0	0
39	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	3	0	0	0	0	0	0	0	0

Line Number. ¶	Diseases reported, which were not printed on the blanks, amount of sickness, etc.¶	Per cent of Weeks Present.‡	Average Order of Prevalence when Present.§
3	Chronic Bright's disease	80	5
	Cancer, stomach	60	6
4	Cystitis, acute	50	6
	Chicken-pox	25	6
10	Delirium tremens	50	4
	Coxitis, angina pectoris, dysmenorrhea, and endometritis, each	25	4
	Coryza, pluro-pneumonia, and dyspepsia, each	25	3
	Conjunctivitis	25	6
	Spasmodic croup	25	2
	Polypus, ear	25	5
13	Indigestion	40	5
	Dyspepsia and pharyngitis, each	20	4
21	Very little sickness, no change. I have been in the State 34 years, and never saw a healthier autumn, Oct. 4. Congestion of the brain for the last few days; continued fever more common, Oct. 11. More brain excitement with congestion, Oct. 18. Not much change, the brain and throat more seriously affected, Oct 25. Tonsilitis prevails, not much change otherwise, Nov. 1.		
22	Diphtheria of a very mild type, Oct. 18. Quite a number of cases of diphtheria are mild, Nov. 1.		
23	Very little sickness, Nov. 1.		
27	Dyspepsia	80	6
	Spasmodic croup	20	6
	Number of cases of diphtheria not so very large, but with a heavy death-rate, over 40 per cent.		
32	Diabetes	20	7
	Many cases of measles which do not come to the doctors, Oct. 4.		
37	Lumbago and dropsy, each	20	5
	Anæmia	80	5
	Gonorrhea	80	6

40	100	6	0	0	40	2	0	0	100	2	40	5	0	0	100	4	0	0	0	0	0	0	100	6
41	0	0	0	0	0	0	0	0	100	2	0	0	0	0	100	2	0	0	0	0	0	0	0	0
42	20	6	40	6	0	0	0	0	40	4	0	0	0	0	40	5	100	4	0	0	20	6	0	0
43	----	----	----	----	----	----	----	----	40	2	----	----	60	3	100	3	----	----	----	----	20	2	----	----
44	100	2	100	1	100	5	0	0	100	5	0	0	0	0	100	5	100	4	0	0	20	6	80	4
45	0	0	20	3	80	2	0	0	20	3	20	3	0	0	20	5	0	0	0	0	0	0	40	2
46	80	3	0	0	0	0	0	0	0	0	0	0	0	0	80	3	40	3	0	0	40	3	100	2
47	0	0	0	0	0	0	0	0	20	4	0	0	0	0	0	0	80	3	0	0	0	0	0	0
48	0	0	0	0	20	2	0	0	40	3	0	0	20	2	0	0	0	0	0	0	20	3	0	0
49	0	0	60	4	0	0	0	0	100	5	100	5	0	0	80	6	60	5	0	0	60	4	20	6
50	40	3	60	2	0	0	0	0	20	3	80	3	0	0	40	3	20	3	0	0	20	1	0	0
51	*40*	*11*	*93*	*2*	*73*	*5*	*0*	*0*	*83*	*4*	*43*	*4*	*0*	*0*	*80*	*4*	*60*	*8*	*0*	*0*	*53*	*5*	*70*	*5*
52	0	0	0	0	----	----	0	0	60	3	20	3	0	0	20	3	40	5	0	0	20	7	40	6
53	----	----	----	----	100	2	----	----	100	4	60	5	----	----	100	4	----	----	----	----	60	3	----	----
54	0	0	0	0	60	3	0	0	80	4	40	5	0	0	100	4	0	0	0	0	100	4	0	0
55	40	11	100	1	60	10	0	0	100	5	100	6	0	0	100	8	80	12	0	0	60	9	0	0
56	----	----	----	----	----	----	----	----	100	6	----	----	----	----	100	5	60	6	----	----	----	----	100	4
57	0	0	0	0	0	0	0	0	40	2	0	0	0	0	60	4	0	0	0	0	40	4	0	0
58	0	0	80	2	0	0	0	0	100	3	20	4	0	0	100	3	0	0	0	0	40	4	0	0
59	0	0	100	3	0	0	0	0	0	0	20	3	0	0	60	3	0	0	0	0	0	0	0	0
60	*47*	*6*	*62*	*5*	*58*	*3*	*0*	*0*	*69*	*4*	*33*	*7*	*50*	*6*	*84*	*4*	*33*	*7*	*0*	*0*	*58*	*5*	*50*	*6*
61	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	2	0	0	0	0	40	3	0	0
62	25	12	50	11	100	1	0	0	100	6	25	7	0	0	100	7	25	6	0	0	100	13	----	----
63	100	4	20	6	----	----	----	----	----	----	----	----	----	----	60	5	----	----	----	----	----	----	----	----
64	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	40	2	0	0
65	0	0	20	4	40	4	0	0	60	4	0	0	20	5	60	4	0	0	0	0	100	3	0	0
66	0	0	20	6	0	0	0	0	100	3	0	0	80	8	80	4	0	0	0	0	80	5	0	0
67	0	0	0	0	0	0	0	0	100	3	0	0	0	0	100	5	20	9	0	0	100	4	100	7
68	20	6	100	4	20	4	0	0	100	4	0	0	0	0	100	4	0	0	0	0	0	0	20	5
69	----	----	----	----	----	----	----	----	----	----	40	7	----	----	100	3	----	----	----	----	80	5	----	----
70	0	0	100	4	40	2	0	0	20	5	0	0	0	0	100	6	40	7	0	0	80	5	0	0
71	0	0	100	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	4	0	0
72	0	0	0	0	0	0	0	0	40	2	0	0	0	0	100	3	0	0	0	0	20	4	0	0
73	0	0	0	0	0	0	0	0	40	5	0	0	0	0	40	5	0	0	0	0	20	5	0	0
74	0	0	0	0	0	0	0	0	40	3	0	0	0	0	40	2	0	0	0	0	80	3	0	0
75	40	3	40	5	0	0	0	0	20	5	0	0	0	0	0	0	40	5	0	0	20	6	0	0
76	0	0	0	0	100	3	0	0	100	5	0	0	0	0	100	7	40	9	0	0	0	0	20	8
77	0	0	100	2	0	0	0	0	100	2	0	0	0	0	100	3	0	0	0	0	40	3	60	4
78	0	0	67	3	0	0	0	0	100	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
79	*76*	*6*	*70*	*5*	*92*	*4*	*96*	*6*	*67*	*5*	*88*	*8*	*20*	*7*	*90*	*5*	*76*	*6*	*0*	*0*	*62*	*7*	*80*	*8*
80	0	0	100	12	80	11	100	9	100	5	100	12	0	0	100	5	100	10	0	0	100	13	100	12
81	100	9	100	8	100	3	100	4	100	4	100	8	0	0	100	6	100	6	0	0	100	10	100	10
82	100	13	0	0	100	1	100	16	100	10	100	9	0	0	100	8	100	5	0	0	100	2	0	0
83	80	5	40	5	100	3	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	40	2
84	0	0	100	3	0	0	0	0	60	5	100	5	0	0	100	7	20	8	0	0	20	9	0	0
85	25	4	75	3	75	4	0	0	0	0	0	0	0	0	50	5	0	0	0	0	0	0	0	0
86	0	0	40	2	0	0	0	0	20	4	0	0	20	7	40	3	60	2	0	0	0	0	0	0
87	100	4	100	4	0	0	0	0	25	3	0	0	0	0	100	4	----	----	0	0	50	6	0	0
88	40	5	40	4	0	0	0	0	100	2	40	6	0	0	100	2	0	0	0	0	20	5	0	0
89	100	2	0	0	0	0	80	1	20	4	0	0	0	0	100	2	0	0	0	0	40	3	0	0
90	60	6	40	5	0	0	100	2	----	----	0	0	0	0	100	5	0	0	0	0	----	----	0	0

39	Rheumatic ophthalmia	20	1
41	Dyspepsia	20	1
45	Whooping-cough confined mostly to children, Oct. 4. Many children are having a cough resembling whooping-cough, yet lacking the characteristic symptoms Oct. 11.		
58	Amenorrhea, leucorrhea, dis. mitral valve, bilious colic, and asthma, each	20	3
	Typhoid pneumonia	40	3
	Cancer breast, gastralgia, delirium tremens, dyspepsia, and Pott's disease of spine, each	20	4
	Gonorrhea	80	3
	Spinal irritation	40	2
	Endocervicitis	60	3
	Orchitis	20	2
61	Peritonitis	40	3
68	Pertussis	20	6
	Cynanche attending typho-malarial fever, two weeks ending Oct. 18. All cases becoming fewer and milder, except diphtheria, Oct. 25. Diseases all light and mild, Nov. 1.		
69	Syphilis	80	5
70	Sickness very light, Nov. 1.		
71	Very healthy for season, Oct. 11.		
74	Uterine congestion	20	4
	Have cases of eczema all the while, Oct. 25. Very little sickness, Nov. 4.		
76	Pharyngitis	60	7
	Jaundice	20	10
	Continues healthy, 5 weeks, ending Nov. 1.		
78	Several cases of hemoptysis, Oct. 18.		
81	Mumps	100	10
82	Health of city good, 3 weeks ending Oct. 11 and 18, and Nov. 1. Some increase of dysentery, Oct. 25.		
84	General state of health good, Oct. 25		
85	Influenza marked as hay-fever, Oct. 4, 11, and 18. Hay-fever has not been severe, but has afflicted to some extent quite a large number of individuals, Oct. 15. Healthy, Oct. 25.		
88	Dyspepsia	100	1
	Cystitis	40	6
	Malaria	100	4
	Health exceedingly good during the month. A physician notes a peculiar tendency to womb troubles, during fall, in women who bore children in Spring.—*Rev. A. W. Bill, of Menominee, on Oct. Meterological Register.*		

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‡ § For explanations and references, see pages 390-1.

¶ The several numbered lines on these two pages continue statements for the localities and divisions which are named and have the same line-numbers on the two preceding pages. On the right-hand side of the page the numbers before the side-notes are the line-numbers of the localities, on pages 422-3, to which the side-notes refer.

TABLE 3.—CONTINUED.—*Diseases, by Localities in Michigan, Four Weeks ending* **November** *29, 1879.*

LINE NUMBER.	DIVISIONS AND LOCALITIES REPRESENTED, AND INITIALS OF PHYSICIANS WHO REPORTED.* (Health Officers in italics; those also Correspondents marked with a *.)	Reports Received.	Brain, Inflam-mat'n of.		Bowels, Inflam-mat'n of.		Bronchitis.		Cerebro-Spinal Men'gitis.		Cholera Infantum.		Cholera Morbus.		Consumption, Pulmonary.		Croup, Membraneous.		Diphtheria.		Diarrhea.		Dysentery.		Erysipelas.		Fever, Intermittent.		Fever, Remittent.	
			Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Preva lence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§
1	ALL LOCALITIES.... .... ‖	281	----	----	----	----	86	3.6	0	0	46	4.1	50	4.7	90	5.4	39	6.5	81	4.4	66	5.5	58	7 4	53	7.0	90	2.4	81	2.9
2	UPPER PENIN. DIV.†.....	*8*	----	----	----	----	*100*	*1*	*0*	*0*	*0*	*0*	*0*	*0*	*100*	*3*	*0*	*0*	*0*	*0*	*100*	*6*	*25*	*6*	*50*	*5*	*0*	*0*	*0*	*0*
3	Houghton—H. W. J.....	4	----	----	----	----	----	----	----	----	----	----	----	----	100	1	----	----	----	----	----	----	----	----	50	5	----	----	----	----
4	Marquette—*G. J. N.**..	4	----	----	----	----	100	1	0	0	0	0	0	0	100	5	0	0	0	0	100	6	25	6	0	0	0	0	0	0
5	NORTH-WESTERN DIV.†.	*8*	----	----	----	----	*100*	*2*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*0*	*25*	*6*	*25*	*4*	*0*	*0*	*100*	*4*	*0*	*0*
6	Cadillac—C. E. M.......	4	----	----	----	----	100	2	0	0	0	0	0	0	0	0	0	0	0	0	25	6	25	4	0	0	100	4	0	0
7	Cadillac—*J. M. W.*.....	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	WESTERN DIV.†..........	*22*	----	----	----	----	*75*	*6*	*0*	*0*	*33*	*5*	*100*	*7*	*75*	*7*	*100*	*5*	*94*	*3*	*56*	*6*	*100*	*12*	*83*	*8*	*86*	*3*	*73*	*3*
9	Cedar Springs—C. S. F.	4	0	0	0	0	50	11	0	0	0	0	0	0	0	0	0	0	100	6	0	0	0	0	100	6	100	1	100	2
10	Drenthe—H. K.	4	0	0	0	0	100	1	0	0	25	4	0	0	25	4	0	0	0	0	75	4	0	0	0	0	100	3	25	4
11	Grand Haven—*J. N. R.*	2	----	----	----	----	0	0	0	0	50	6	0	0	0	0	100	5	100	1	0	0	0	0	0	0	100	4	50	2
12	Grand Haven—A. V....	4	----	----	----	----	100	3	----	----	----	----	----	----	----	----	----	----	100	2	25	4	----	----	----	----	25	7	50	4
13	Grand Rapids—A. H....	4	0	0	0	0	25	7	0	0	0	0	0	0	100	6	0	0	75	5	25	7	0	0	50	7	100	2	100	1
14	Muskegon—*O. C. W.*....	4	----	----	---	----	100	9	0	0	0	0	100	7	100	10	0	0	100	3	100	9	100	12	100	12	100	1	100	2
15	NORTH'N-CENT'L DIV.†..	*4*	*0*	*0*	*0*	*0*	*50*	*3*	*0*	*0*	*25*	*6*	*0*	*0*	*0*	*0*	*0*	*0*	*100*	*2*	*25*	*6*	*25*	*2*	*75*	*4*	*75*	*2*	*0*	*0*
16	Big Rapids—*I. W. B.*...	4	0	0	0	0	50	3	0	0	25	6	0	0	0	0	0	0	100	2	25	6	25	2	75	4	75	2	0	0
17	BAY AND EAST'N DIV.†..	*39*	*25*	*9*	*50*	*8*	*100*	*3*	*0*	*0*	*0*	*0*	*0*	*0*	*100*	*7*	*38*	*7*	*84*	*5*	*65*	*6*	*45*	*6*	*55*	*8*	*95*	*2*	*81*	*4*
18	Bay City—W. R. M.....	4	0	0	0	0	100	3	0	0	0	0	0	0	100	5	0	0	100	7	100	6	0	0	75	7	100	1	100	5
19	Lapeer—*H. McC.*........	3	----	----	----	----	100	1	----	----	----	----	----	----	----	----	----	----	100	3	33	5	33	4	33	4	100	2	100	4
20	Lapeer—I. H. T........	4	----	----	----	----	100	2	0	0	0	0	0	0	0	0	25	5	75	1	50	4	0	0	0	0	100	3	50	3
21	Port Huron—*E. P. T.*..	4	25	9	50	11	100	3	0	0	0	0	0	0	100	10	25	14	75	7	100	7	0	0	50	12	100	6	100	4
22	Port Huron—A. A. W..	4	0	0	0	0	100	3	0	0	0	0	0	0	100	7	25	7	25	7	0	0	0	0	0	0	100	1	25	2
23	Port Sanilac—J. M. L..	4	----	----	----	----	---	----	----	----	----	----	----	----	----	----	75	1	----	----	----	----	----	----	----	----	50	2	----	----
24	Saginaw City—*E. A. H.*.	4	0	0	0	0	100	5	0	0	0	0	0	0	100	8	0	0	100	3	50	10	50	9	0	0	100	1	100	3
25	Saginaw City—N. D. L..	4	0	0	50	5	100	4	0	0	0	0	0	0	100	5	0	0	100	4	50	5	0	0	0	0	100	1	0	0
26	Thornville—J. S. C.....	4	0	0	50	7	100	3	0	0	0	0	0	0	100	7	0	0	0	0	0	0	50	5	0	0	100	2	0	0
27	W. Bay City—*I. E. R.**.	4	0	0	0	0	100	7	0	0	0	0	0	0	100	4	0	0	100	5	0	0	0	0	0	0	100	2	100	4
28	CENTRAL DIVISION†.....	*64*	*25*	*9*	*25*	*4*	*85*	*4*	*0*	*0*	*67*	*4*	*50*	*4*	*92*	*6*	*25*	*7*	*78*	*4*	*68*	*4*	*75*	*4*	*50*	*6*	*96*	*3*	*83*	*3*
29	Charlotte—*P. D. P.*....	4	----	----	----	----	100	8	0	0	100	5	100	6	25	10	0	0	25	9	100	3	100	5	0	0	100	1	100	2
30	Corunna—*A. G. B.*......	4	0	0	0	0	100	8	0	0	0	0	0	0	100	8	25	14	100	9	50	8	0	0	100	12	100	4	100	2
31	DeWitt—G. W. T.......	4	0	0	0	0	100	1	0	0	0	0	0	0	100	7	0	0	0	0	75	5	0	0	0	0	100	6	75	7
32	Elsie—E. V. C...........	4	----	----	----	----	0	0	0	0	75	4	0	0	0	0	0	0	75	4	75	3	0	0	50	6	75	2	100	1
33	Hastings—A. P. D......	4	0	0	0	0	0	0	0	0	0	0	0	0	100	3	0	0	100	2	0	0	0	0	25	4	100	1	0	0
34	Hubbardston—H.W.B..	4	25	9	0	0	25	8	0	0	0	0	0	0	100	10	0	0	0	0	50	7	0	0	0	0	100	1	25	4
35	Ionia, H. of C.—W. F. R.	4	0	0	0	0	75	2	0	0	0	0	0	0	0	0	25	3	0	0	100	2	50	3	0	0	100	2	0	0
36	Ionia—*S. V. R.*..........	4	0	0	0	0	0	0	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	0	0	100	3	100	3
37	Ithaca—I. N. M.........	4	----	----	----	----	----	----	----	----	25	2	----	----	----	----	----	----	50	2	25	2	----	----	50	2	----	----	----	----
38	Lansing—*J. H. W.*......	4	0	0	0	0	100	7	0	0	0	0	0	0	100	6	0	0	100	1	0	0	0	0	25	6	75	5	75	4
39	Muir—L. S. S............	4	0	0	0	0	75	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	2	0	0

40	North Lansing—O. M.	4	0	0	25	4	100	4	0	0	0	0	25	4	100	3	25	4	100	4	75	4	0	0	0	0	100	3	0	0
41	Otisville—A. W. N.	4	0	0	0	0	100	1	0	0	0	0	0	0	100	2	0	0	100	3	50	4	0	0	0	0	0	0	0	0
42	Ovid—O. B. C.	4	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	25	2	0	0	0	0	0	0	0	0	100	1
43	Vernon—D. C. H.	4	0	0	0	0	100	4	0	0	0	0	0	0	0	0	0	0	0	0	100	6	0	0	0	0	100	1	100	2
44	Webberville—R. B. S	4	0	0	0	0	50	3	0	0	0	0	25	3	0	0	0	0	100	2	50	3	0	0	0	0	100	2	50	2
45	SOUTH-WESTERN DIV.†	*32*	----	----	*50*	*3*	*71*	*4*	*0*	*0*	*0*	*0*	*25*	*2*	*81*	*4*	*50*	*5*	*65*	*3*	*58*	*5*	*50*	*10*	*25*	*5*	*88*	*2*	*75*	*2*
46	Allegan—W. H. B.	4	0	0	0	0	100	5	0	0	0	0	0	0	100	6	0	0	25	4	0	0	0	0	0	0	100	2	25	2
47	Cassopolis—F. G.	4	----	----	----	----	----	----	----	----	----	----	----	----	25	4	75	4	100	1	----	----	----	----	25	6	100	4	----	----
48	Dayton—R. H.	4	0	0	50	3	25	2	0	0	0	0	25	2	100	2	0	0	0	0	50	2	0	0	25	1	50	1	75	2
49	Niles—J. S. R.	4	----	----	----	----	75	8	0	0	0	0	0	0	100	5	0	0	0	0	25	11	50	10	25	7	75	7	100	2
50	Niles—*I. S.*	4	----	----	----	----	100	3	----	----	----	----	----	----	75	7	----	----	----	----	----	----	----	----	----	----	100	1	100	2
51	Otsego—M. C.	4	0	0	0	0	50	3	0	0	0	0	0	0	100	4	25	5	50	5	0	0	0	0	0	0	75	1	25	2
52	Paw Paw—J. A.	4	----	----	----	----	50	3	0	0	0	0	0	0	75	2	0	0	50	3	100	3	0	0	0	0	100	2	100	1
53	St. Joseph—R. F. S.	4	----	----	----	----	100	1	0	0	0	0	0	0	75	3	0	0	100	3	0	0	0	0	0	0	100	1	100	1
54	SOUTH'N-CENTRAL DIV.†	*69*	*50*	*4*	*42*	*4*	*87*	*3*	*0*	*0*	*25*	*2*	*25*	*6*	*86*	*5*	*25*	*3*	*74*	*5*	*59*	*5*	*67*	*7*	*35*	*6*	*90*	*2*	*90*	*3*
55	Adrian—*A. M. S.*	4	----	----	----	----	100	2	0	0	25	2	0	0	50	3	25	3	25	2	50	3	25	3	0	0	100	2	50	2
56	Albion—A. M. D.	4	0	0	0	0	100	2	0	0	0	0	25	6	100	7	0	0	25	10	100	9	100	11	25	12	100	3	100	7
57	Battle Creek—*S. S. F.**	4	----	----	----	----	----	----	----	----	----	----	----	----	100	7	----	----	100	4	75	5	----	----	----	----	100	4	100	2
58	Brooklyn—E. N. P.	4	----	----	50	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	50	1	----	----	----	----
59	Centreville—M. S.	4	----	----	0	0	0	0	0	0	0	0	0	0	50	5	0	0	100	4	50	4	0	0	0	0	100	2	100	1
60	Clinton—A. W. A.	4	0	0	50	8	0	0	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	25	5	100	1	100	4
61	Coldwater—*G. V. V.*	4	0	0	0	0	100	2	0	0	0	0	0	0	100	8	0	0	0	0	25	8	0	0	0	0	100	3	0	0
62	Hillsdale—*J. W. F.**	4	50	4	25	3	25	4	0	0	0	0	0	0	25	2	0	0	0	0	50	3	0	0	50	3	75	1	75	2
63	Jackson (Prison), E. L. K.	4	----	----	----	----	100	1	----	----	----	----	----	----	100	4	----	----	----	----	----	----	----	----	----	----	100	3	----	----
64	Jackson—W. W.	4	0	0	0	0	100	2	0	0	0	0	0	0	100	3	0	0	100	7	0	0	0	0	0	0	75	5	75	5
65	Kalamazoo—W. B. S.	4	0	0	0	0	0	0	0	0	0	0	0	0	100	7	0	0	0	0	0	0	0	0	0	0	100	1	100	2
66	Marshall—*B. A. G.*	3	----	----	----	----	----	----	----	----	----	----	----	----	67	2	----	----	100	3	33	1	----	----	----	----	33	1	----	----
67	Marshall—H. L. J.	4	0	0	0	0	100	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0
68	Mendon—H. C. C.	2	0	0	----	----	100	3	0	0	0	0	0	0	100	5	0	0	0	0	0	0	0	0	0	0	100	1	100	4
69	Mendon—E. S.	4	----	----	----	----	100	3	0	0	0	0	0	0	6	0	0	0	0	0	50	3	0	0	0	0	100	2	100	2
70	Sturgis—N. I. P.	4	0	0	0	0	50	3	0	0	0	0	0	0	100	2	0	0	0	0	0	0	0	0	0	0	50	1	0	0
71	Three Rivers—C. W. B.	4	----	----	----	----	100	3	0	0	0	0	0	0	100	9	0	0	0	0	75	8	0	0	25	11	100	1	100	3
72	Union City—N. H. C.	4	----	----	----	----	75	3	0	0	0	0	0	0	100	8	0	0	75	4	75	7	75	8	0	0	100	1	0	0
73	SOUTH-EASTERN DIV.†	*38*	*83*	*13*	*68*	*9*	*89*	*3*	*0*	*0*	*0*	*0*	*0*	*0*	*97*	*5*	*42*	*9*	*94*	*8*	*96*	*7*	*69*	*11*	*70*	*10*	*78*	*3*	*75*	*4*
74	Detroit—L. C.	4	100	18	100	17	100	2	0	0	0	0	0	0	100	5	0	0	0	0	100	11	75	16	100	14	100	2	100	9
75	Detroit—*E. L.*	4	----	----	----	----	100	6	0	0	0	0	0	0	100	8	0	0	100	9	100	8	100	9	100	10	100	1	100	2
76	Detroit—W. H. R.	4	100	16	100	18	100	6	0	0	0	0	0	0	100	7	50	17	100	12	100	14	75	14	100	15	100	4	100	4
77	Milford—R. J.	4	----	----	----	----	100	3	----	----	----	----	----	----	100	4	----	----	----	----	----	----	----	----	----	----	100	2	----	----
78	Monroe—*A. J. M.*	4	----	----	25	9	0	0	0	0	0	0	0	0	100	7	25	4	0	0	0	0	25	5	0	0	25	1	75	1
79	Northville—J. M. S.	2	0	0	50	3	0	0	0	0	0	0	0	0	100	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
80	Trenton—W. C.	4	0	0	0	0	0	0	0	0	0	0	0	0	100	4	0	0	0	0	0	0	0	0	0	0	75	1	50	2
81	Washington—A. Y.	4	50	5	100	5	100	2	0	0	0	0	0	0	100	4	50	5	75	5	75	5	0	0	0	0	0	0	0	0
82	Wyandotte—E. P. C.	4	0	0	25	3	50	3	0	0	0	0	0	0	100	4	0	0	0	0	100	2	0	0	25	4	75	4	0	0
83	Wyandotte—*T. J. L.*	4	----	----	----	----	75	2	0	0	0	0	0	0	75	7	0	0	100	4	100	3	0	0	25	6	50	6	25	6

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*, †, ‡, §, ‖, For explanations and references, see foot-notes on pages 390-1.

NOTE FOR DEC.—*Line 28 (Page 430).*—There is a class of cases of tonsilitis which do not exhibit the characteristic exudation of diphtheria, yet which seem communicable, and generally affect several members of the same family, week ending Dec. 13. The class of cases referred to in my report of Dec. 13, 1879, is a little out of our usual experience in cases of tonsilitis; no *plastic* exudation, but a slight follicular secretion, having the appearance of thickened mucus, spread thinly over the tonsils. In one family the servant girl first had the disease; she had the care of a three-year-old child, which soon became affected, and next the father and grandmother of the child, who were in the habit of fondling it, were attacked, the attack in all of the cases being accompanied with febrile movement; swelling was not very extensive. I took the same precautions and treated the cases very much as I would diphtheria, Jan. 15, 1880. [In reply to questions, Dr. Randall wrote as follows, Jan. 20:] None of the cases I have had of this kind have proved fatal, nor have any shown any indications of paralysis. There was some increase of temperature in all of the cases of the family to which I referred,—in the child for 24 h.; the father (aged 30), for 8 h.; the grandmother (aged 62), for 18 hours. I do not think any other persons (children) were exposed, as I cautioned them about permitting visitors, particularly children, to enter the house. The old lady's attack was the most violent, but the child's throat was affected for a longer time than any of the others, its tonsils being rather hypertrophied naturally even previously to the attack. In another family there was one boy aged 16 who was affected severely, pus forming in the tonsils, and two younger children being slightly affected; there were other children in the same family who did not become affected.—*I. E. Randall, M. D., of West Bay City.*

TABLE 3.—*Diseases, by Localities, in Michigan, Four Weeks ending* **November** *29, 1879*—CONTINUED.

LINE NUMBER. ¶	Fever, Typhoid (Enteric).		Fever, Typho-Malarial.		Influenza.		Measles.		Neuralgia.		Pneumonia.		Puerperal Fever.		Rheumatism.		Scarlatina.		Small-pox.		Tonsilitis.		Whooping-Cough.	
	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present ‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§	Per ct. of Weeks Present.‡	Av. Ord. of Prev. when Present.§
1	80	6.0	74	5.3	76	3.7	81	4.0	84	4.1	63	5.2	42	7.5	89	4.7	76	6.2	25	20.0	73	4.3	71	5.8
2	*100*	*4*	*75*	*7*	*100*	*2*	*0*	*0*	*100*	*6*	*50*	*6*	*75*	*7*	*100*	*4*	*100*	*2*	*0*	*0*	*75*	*3*	*100*	*3*
3	100	4			100	2															50	3		
4	0	0	75	7	100	1	0	0	100	6	50	6	75	7	100	4	100	2	0	0	100	2	100	3
5	*0*	*0*	*63*	*3*	*0*	*0*	*0*	*0*	*88*	*2*	*25*	*1*	*0*	*0*	*100*	*4*	*0*	*0*	*0*	*0*	*63*	*3*	*25*	*1*
6	0	0	50	5	0	0	0	0	100	3	0	0	0	0	100	4	0	0	0	0	75	4	0	0
7	0	0	75	1	0	0	0	0	75	1	25	1	0	0	0	0	0	0	0	0	50	1	25	1
8	*100*	*14*	*70*	*9*	*63*	*6*	*75*	*7*	*95*	*5*	*80*	*4*	*25*	*7*	*80*	*7*	*70*	*8*	*0*	*0*	*77*	*5*	*67*	*6*
9	0	0	0	0	100	6	75	7	100	5	0	0	0	0	100	8	100	7	0	0	100	9	75	11
10	0	0	0	0	0	0	0	0	100	3	0	0	0	0	50	4	0	0	0	0	75	3	25	1
11	0	0	100	5	0	0	0	0	0	0	50	3	0	0	0	0	100	2	0	0	50	3	0	0
12			25	7	25	3			75	6	100	4			100	5					100	5		
13	0	0	0	0	100	3	0	0	100	5	75	6	25	7	50	6	0	0	0	0	25	5	0	0
14	100	14	100	14	25	13	0	0	100	6	0	0	0	0	100	14	25	16	0	0	100	5	100	6
15	*75*	*2*	*100*	*3*	*0*	*0*	*0*	*0*	*75*	*2*	*25*	*3*	*0*	*0*	*75*	*3*	*0*	*0*	*0*	*0*	*75*	*4*	*25*	*6*
16	75	2	100	3	0	0	0	0	75	2	25	3	0	0	75	3	0	0	0	0	75	4	25	6
17	*63*	*7*	*80*	*5*	*83*	*4*	*63*	*3*	*97*	*5*	*65*	*5*	*25*	*10*	*91*	*5*	*63*	*7*	*0*	*0*	*78*	*4*	*58*	*6*
18	0	0	0	0	100	3	25	5	100	5	100	7	0	0	100	7	0	0	0	0	100	3	75	7
19											33	4												
20	0	0	0	0	0	0	0	0	75	3	25	4	0	0	75	4	0	0	0	0	75	2	0	0
21	25	10	0	0	100	1	0	0	100	9	100	5	0	0	100	6	25	8	0	0	0	0	0	0
22	100	5	100	3	25	6	0	0	100	5	25	5	0	0	50	6	100	5	0	0	25	7	75	6
23			75	2																	25	2		
24	50	8	100	8	100	9	0	0	100	4	100	8	25	10	100	4	0	0	0	0	100	3	25	6
25	75	5	75	5	0	0	0	0	100	2	25	5	0	0	100	3	0	0	0	0	100	5	0	0
26	0	0	0	0	75	1	0	0	100	4	0	0	0	0	100	5	0	0	0	0	100	6	0	0
27	0	0	50	7	100	5	100	1	100	4	100	5	0	0	100	6	0	0	0	0	100	5	0	0
28	*86*	*5*	*75*	*6*	*86*	*4*	*0*	*0*	*67*	*4*	*75*	*5*	*75*	*10*	*79*	*5*	*81*	*4*	*0*	*0*	*61*	*5*	*100*	*5*
29	0	0	50	12	100	7	0	0	75	9	0	0	0	0	75	9	0	0	0	0	25	11	0	0
30	100	8	100	7	100	4	0	0	100	4	100	8	0	0	100	10	0	0	0	0	0	0	100	12
31	0	0	0	0	0	0	0	0	100	4	100	8	75	10	100	4	0	0	0	0	100	2	0	0
32	0	0	50	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75	5	0	0
33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
34	100	7	0	0	75	2	0	0	100	3	100	5	0	0	100	4	0	0	0	0	25	7	100	7
35	0	0	0	0	0	0	0	0	100	2	25	2	0	0	100	2	0	0	0	0	100	2	0	0
36	100	7	0	0	100	4	0	0	25	7	0	0	0	0	50	6	100	5	0	0	0	0	100	1
37									75	1					75	2					75	2		
38	100	2	75	2	100	6	0	0	100	6	25	8	0	0	100	5	100	2	0	0	25	8	100	4
39	0	0	0	0	100	2	0	0	25	4	0	0	0	0	75	3	0	0	0	0	0	0	0	0

	DISEASES REPORTED, WHICH WERE NOT PRINTED ON THE BLANKS, AMOUNT OF SICKNESS, ETC. ¶	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§
3	Chronic Bright's disease	100	5
	Pleurisy and cancer stomach, each	75	5
6	False croup	25	6
	Urticaria	25	5
10	Dyspepsia	100	2
18	But little change, Nov. 8 and 15. But little sickness, Nov. 22. The change is mostly in the mucous membrane of the throat and air-passages, Nov. 29.		
20	The croup was complicated with diphtheria, Nov. 15.		
24	Dyspepsia	25	11
25	Very little sickness, 3 weeks ending Nov. 29.		
31	Gonorrhea	75	8
	Metrorrhagia	25	10
	Lithiasis	25	9
33	But very little sickness, Nov. 22.		
34	Pemphigus	25	7
40	Laryngitis	25	4
41	Typhoid pneumonia	25	4
48	Pericarditis (chronic)	100	2
	Purulent ophthalmia	100	2
51	Apoplexy	50	5
52	Typhoid pneumonia	50	3
	Gonorrhea	50	2
	Synovitis and carbuncle, each	25	2
	Dropsy and spinal irritation, each	25	3
	Dyspepsia	75	2
	Flowing	50	3
	Syphilis	75	3
55	Peritonitis	25	3
56	Little sickness, and cases mild, Nov. 8.		
61	I hear of cases of diphtheria about the city, but physicians will not report it, Nov. 27.		
62	Peritonitis, one case, died, week ending Nov. 15. Almost no sickness, Nov. 22.		

40	75	8	0	0	0	0	0	0	0	0	100	3	0	0	100	3	25	3	0	0	75	4	100	1
41	0	0	0	0	0	0	0	0	25	4	0	0	0	0	75	4	0	0	0	0	0	0	0	0
42	25	2	0	0	0	0	0	0	25	2	50	3	0	0	25	4	0	0	0	0	25	4	0	0
43	0	0	100	4	0	0	0	0	100	5	100	5	0	0	100	5	100	5	0	0	100	4	0	0
44	100	3	0	0	25	1	0	0	25	3	75	3	0	0	25	3	0	0	0	0	55	2	0	0
45	*0*	*0*	*63*	*3*	*58*	*3*	*25*	*8*	*79*	*4*	*43*	*5*	*0*	*0*	*96*	*4*	*100*	*4*	*0*	*0*	*75*	*4*	*38*	*6*
46	0	0	0	0	0	0	0	0	75	3	50	4	0	0	----	----	100	2	0	0	0	0	25	5
47	----	----	----	----	100	2	----	----	50	6	50	6	----	----	100	5	----	----	----	----	100	4	----	----
48	0	0	0	0	50	2	0	0	100	1	0	0	0	0	100	2	0	0	0	0	75	2	0	0
49	0	0	0	0	75	6	25	8	100	5	75	7	0	0	100	8	100	2	0	0	100	6	25	12
50	----	----	----	----	----	----	----	----	100	5	25	7	----	----	100	6	100	7	----	----	----	----	75	5
51	0	0	0	0	75	2	0	0	25	3	25	5	0	0	100	3	0	0	0	0	0	0	0	0
52	0	0	50	3	25	2	0	0	100	2	25	3	0	0	100	3	0	0	0	0	25	2	25	1
53	0	0	75	3	25	1	0	0	0	0	50	3	0	0	75	2	0	0	0	0	0	0	0	0
54	*75*	*4*	*61*	*5*	*85*	*3*	*0*	*0*	*86*	*4*	*67*	*5*	*25*	*6*	*91*	*4*	*46*	*7*	*0*	*0*	*74*	*4*	*71*	*4*
55	0	0	0	0	0	0	0	0	75	2	25	2	0	0	75	2	50	3	0	0	0	0	0	0
56	0	0	50	7	100	2	0	0	100	7	100	8	0	0	100	7	0	0	0	0	100	9	0	0
57	100	3	100	4	----	----	----	----	----	----	----	----	25	9	100	8	----	----	----	----	75	7	----	----
58	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
59	0	0	0	0	0	0	0	0	100	4	75	5	0	0	100	4	25	5	0	0	100	3	0	0
60	75	6	25	6	0	0	0	0	100	3	25	5	0	0	100	3	50	8	0	0	25	2	0	0
61	0	0	0	0	0	0	0	0	100	2	100	7	0	0	100	5	25	9	0	0	100	5	100	6
62	0	0	25	3	50	2	0	0	100	3	0	0	0	0	100	3	0	0	0	0	0	0	0	0
63	----	----	----	----	----	----	----	----	----	----	----	----	----	----	100	3	----	----	----	----	100	3	----	----
64	0	0	25	7	75	1	0	0	100	6	75	5	0	0	100	5	25	9	0	0	0	0	0	0
65	0	0	100	6	100	3	0	0	0	0	50	5	0	0	0	0	0	0	0	0	100	4	0	0
66	----	----	----	----	----	----	----	----	33	1	33	1	----	----	----	----	----	----	----	----	67	2	33	2
67	0	0	0	0	0	0	0	0	75	2	0	0	0	0	100	3	0	0	0	0	50	2	0	0
68	0	0	0	0	0	0	0	0	50	3	0	0	0	0	100	4	0	0	0	0	0	0	0	0
69	0	0	0	0	0	0	0	0	----	----	0	0	0	0	50	4	0	0	0	0	50	4	0	0
70	50	4	0	0	0	0	0	0	50	4	0	0	25	2	50	3	0	0	0	0	25	4	0	0
71	0	0	6	0	100	5	0	0	100	5	0	0	0	0	100	6	100	8	0	0	----	----	0	0
72	0	0	100	2	0	0	0	0	100	4	25	7	0	0	100	6	0	0	0	0	100	3	0	0
73	*80*	*7*	*90*	*6*	*67*	*4*	*100*	*3*	*89*	*5*	*79*	*7*	*0*	*0*	*97*	*4*	*100*	*9*	*25*	*20*	*85*	*6*	*90*	*8*
74	0	0	100	11	100	10	100	4	100	6	100	13	0	0	100	4	100	10	0	0	100	13	100	7
75	100	9	100	7	100	3	100	2	100	5	100	7	0	0	100	4	100	8	0	0	100	7	100	10
76	100	14	0	0	100	1	100	7	100	12	100	9	0	0	100	8	100	9	25	20	100	2	75	20
77	100	5	----	----	50	3	----	----	----	----	50	5	----	----	----	----	----	----	----	----	----	----	100	1
78	0	0	100	2	25	3	0	0	100	4	100	4	0	0	100	7	100	7	0	0	0	0	0	0
79	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	2	0	0	0	0	0	0	0	0
80	0	0	0	0	0	0	0	0	75	3	0	0	0	0	75	4	0	0	0	0	0	0	75	4
81	0	0	100	5	25	5	0	0	100	3	0	0	0	0	100	1	0	0	0	0	75	4	0	0
82	50	3	50	3	0	0	100	1	50	4	25	4	0	0	100	3	0	0	0	0	50	3	0	0
83	50	7	0	0	0	0	100	1	----	----	0	0	0	0	100	5	0	0	0	0	----	----	0	0

63	Syphilis	100	4
64	Sickness very light, Nov. 29.		
68	Mumps	25	2
	Congestion of bowels	25	5
69	Bright's disease	25	4
71	Pharyngitis	100	7
	Catarrh	25	6
	Continues healthy.		
75	Mumps	100	10
76	Measles more common; one case of small-pox reported; not much sickness, Nov. 15. Quite a number of cases of measles, light, Nov. 22.		
	Chicken-pox	25	21
79	No sickness except chronic, Nov. 29.		
81	Dyspepsia	100	1
	Malaria	75	3
	Colds and sore throats, with mild cases of diphtheritic tonsilitis have prevailed during the month, mostly with children.—*A. W. Bill, of Menominee, on November meteorological register.*		
	There are quite a number of cases of sore throat approaching diphtheria, and one case of genuine diphtheria, resulting in death; there are not enough cases to make it prevalent or general.—*I. N. Mitchell, of Hastings, in Nov.*		
	Nov. 10, 1879, Geo. W. Orr, M. D., of Central Mine, wrote: "Our population reaches nearly 1,500, of which more than half is Cornish, the balance being about equally divided German, Irish, and French. We have between 90 and 100 births a year. We have a number of women that have had 15 children, and one that has had 17, and she is only 42 years of age, and does not look over 35. This is a tonic climate; the children all look florid and healthy. We have no malarial troubles here, but rheumatism (particularly muscular), neuralgia, tonsilitis, scarlet fever, and throat and bronchial troubles are frequent."		

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‡, § For explanations and references, see pages 390–1. Full tabular heads are printed on pages 386, 388.

¶ The several numbered lines on these two pages continue statements for the localities and divisions which are named and have the same line-numbers on the two preceding pages. On the right-hand side of the page the numbers before the side-notes are the line-numbers of the localities on pages 426–7, to which the side-notes refer.

NOTE FOR DECEMBER.—*Line 36 (page 430).*—Jan. 12, 1880, Dr. W. F. Reed, of the State House of Correction, Ionia, wrote: "I have reported several cases of 'diphtheria.' They are not cases of *genuine* diphtheria. The tonsils swell, become puffy; the uvula and the whole fauces are inflamed and puffy; white spots appear in the tonsils, uvula, and fauces, some of them as large as the thumb-nail. Added to these, or usually in advance of them, are constitutional symptoms, headache, pain in the back, in the bones, chills, fever. The cases last on an average four or five days. Many of the patients are syphilitic. Only three of the cases were in children. In them it appeared as genuine diphtheria, in a mild form. All other cases were 'inmates' of about the age of 20 or 25. The local throat symptoms preceded by and accompanied by the constitutional symptoms lead me to diagnose diphtheria."

TABLE 3.—CONTINUED.—*Diseases, by Localities in Michigan,* **December**, *1879 (Five Weeks ending Jan. 3, 1880).*

Line Number.	Divisions and Localities Represented, and Initials of Physicians who Reported*. (Health Officers in italics; those also Correspondents marked with a *.)	Reports Received.	Brain, Inflamm't'n of.		Bowels, Inflamm't'n of.		Bronchitis.		Cerebro-Spinal Men'gitis.		Cholera Infantum.		Cholera Morbus.		Consumption, Pulmonary.		Croup, Membraneous.		Diphtheria.		Diarrhea.		Dysentery.		Erysipelas.		Fever, Intermittent.		Fever, Remittent.	
			Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present ‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present ‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§
1	ALL LOCALITIES.........‖	367	----	----	----	----	84	3.4	26	8.8	25	4.5	36	5.1	85	5 8	44	6.9	70	5.2	61	5.8	40	8.4	50	6.5	81	2.8	73	3.8
2	UPPER-PENIN. DIV......†	15	0	0	40	5	73	3	0	0	0	0	0	0	100	4	0	0	0	0	40	4	30	5	20	3	0	0	0	0
3	Central Mine—G. W. O.	5	0	0	40	4	60	3	0	0	0	0	0	0	0	0	0	0	0	0	40	3	20	4	20	3	0	0	0	0
4	Houghton—H. W. J.....	5	0	0	40	5	60	3	0	0	0	0	0	0	100	2	0	0	0	0	40	4	0	0	0	0	0	0	0	0
5	Marquette—*G. J. N.*..*	5	----	----	----	----	100	2	0	0	0	0	0	0	100	5	0	0	0	0	0	0	40	6	0	0	0	0	0	0
6	NORTH-WESTERN DIV..†	10	0	0	0	0	100	2	0	0	0	0	20	4	40	5	0	0	0	0	0	0	80	5	0	0	80	3	0	0
7	Cadillac—C. E. M......	5	0	0	0	0	100	2	0	0	0	0	20	4	40	5	0	0	0	0	0	0	80	5	0	0	80	3	----	----
8	Cadillac—*J. M. W.*......	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9	WESTERN DIV...........†	29	0	0	0	0	83	5	0	0	0	0	67	7	63	8	44	6	83	4	79	5	50	10	67	7	92	2	86	2
10	Cedar Springs—C. S. F..	5	0	0	0	0	80	6	0	0	0	0	0	0	0	0	0	0	20	6	0	0	0	0	80	5	100	1	20	2
11	Drenthe—H. K..........	5	0	0	0	0	100	1	0	0	0	0	0	0	0	0	0	0	0	0	80	4	0	0	20	3	100	3	100	4
12	Grand Haven—*J. N. R.*..	4	0	0	0	0	50	4	0	0	0	0	25	5	25	6	25	5	100	2	50	4	0	0	0	0	100	2	100	2
13	Grand Haven—A. V....	5	----	----	----	----	100	5	----	----	----	----	----	----	20	7	----	----	100	2	----	----	20	7	----	----	----	----	100	2
14	Grand Rapids—A. H....	5	0	0	0	0	60	6	0	0	0	0	0	0	100	5	60	7	100	6	0	0	0	0	0	0	60	4	100	2
15	Muskegon—*O. C. W.*....	5	----	----	----	----	100	7	0	0	0	0	100	9	100	13	0	0	100	4	100	8	80	12	100	12	100	1	100	2
16	NORTHERN-CENT. DIV..†	5	----	----	----	----	20	5	----	----	----	----	----	----	20	4	20	5	80	2	----	----	----	----	40	3	20	4	20	4
17	Big Rapids—*I. W. B.*....	5	----	----	----	----	20	5	----	----	----	----	----	----	20	4	20	5	80	2	----	----	----	----	40	3	20	4	20	4
18	BAY AND EAST'N DIV...†	48	40	7	33	7	100	3	33	9	20	6	0	0	97	7	47	8	73	5	55	6	20	9	56	7	94	2	79	5
19	Bay City—W. R. M.....	5	0	0	0	0	100	3	0	0	0	0	0	0	100	5	100	7	100	6	100	6	0	0	60	7	100	1	100	6
20	Lapeer—*H. McC.*........	5	----	----	----	----	100	2	----	----	----	----	----	----	----	----	----	----	20	2	----	----	----	----	----	----	100	1	80	3
21	Lapeer—I. H. T.........	4	----	----	----	----	100	2	0	0	0	0	0	0	0	0	0	0	25	4	50	3	0	0	50	4	100	3	50	4
22	Port Huron—*E. P. T.*...	4	0	0	0	0	100	3	25	12	0	0	0	0	75	10	50	9	75	7	75	12	0	0	75	11	100	8	75	5
23	Port Huron—A. A. W..	5	----	----	----	----	100	2	40	6	20	6	0	0	100	7	0	0	0	0	20	5	0	0	0	0	100	1	40	3
24	Port Sanilac—J. M. L..	5	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	20	3	----	----	----	----	40	2	----	----
25	Saginaw City—*E. A. H.*	5	0	0	20	10	100	3	0	0	0	0	0	0	100	9	20	11	80	7	80	9	20	12	0	0	100	2	100	6
26	Saginaw City—N. D. L.	5	0	0	40	6	100	4	0	0	0	0	0	0	100	5	20	6	100	4	0	0	0	0	0	0	100	1	0	0
27	Thornville—J. S. C.....	5	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	0	0	40	4	20	6	40	7	100	2	0	0
28	W. Bay City—*I. E. R.* *	5	40	7	40	6	100	7	0	0	0	0	0	0	100	4	0	0	100	5	0	0	0	0	0	0	100	1	100	5
29	CENTRAL DIV........... .†	79	0	0	20	3	78	4	0	0	30	5	20	6	86	5	40	8	75	4	50	6	20	5	43	6	75	3	74	3
30	Charlotte—*P. D. P.*.....	5	0	0	0	0	100	5	0	0	20	5	20	6	100	9	0	0	100	7	80	8	20	6	0	0	100	2	100	1
31	Corunna—*A. G. B.*......	5	0	0	0	0	100	2	0	0	0	0	0	0	100	7	60	10	80	7	20	11	0	0	40	9	60	9	80	10
32	DeWitt—G. W. T.......	5	0	0	0	0	100	1	0	0	0	0	0	0	100	7	20	10	20	9	0	0	0	0	0	0	20	9	0	0
33	Elsie—E. V. C...........	5	0	0	20	3	0	0	0	0	40	5	0	0	0	0	0	0	100	4	0	0	0	0	20	4	100	2	80	2
34	Hastings—A. P. D.....	5	0	0	0	0	0	0	0	0	0	0	0	0	100	3	0	0	80	3	0	0	0	0	20	4	100	1	0	0
35	Hubbardston—H. W. B.	5	0	0	0	0	40	9	0	0	0	0	0	0	100	9	0	0	20	10	20	6	0	0	0	0	40	1	20	4
36	Ionia—H. of Cor., W. F. R.	5	0	0	20	4	40	3	0	0	0	0	0	0	80	4	0	0	80	1	60	2	0	0	0	0	80	3	0	0
37	Ionia—*S. V. R.*..........	5	0	0	0	0	20	6	0	0	0	0	0	0	100	6	0	0	0	0	0	0	0	0	20	9	80	2	100	3
38	Ithaca—I. N. M.........	5	----	----	----	----	----	----	----	----	----	----	----	----	20	3	40	3	80	2	----	----	20	3	100	2	40	3	40	3

39	Lansing—*J. H. W.*	5	0	0	0	0	100	5	0	0	0	0	0	0	100	5	0	0	100	1	0	0	0	0	40	7	0	0	20	6
40	Muir—L. S. S.	5	0	0	0	0	60	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	1	100	3
41	North Lansing—O. M.	5	0	0	20	3	100	2	0	0	0	0	0	0	100	2	0	0	80	2	20	3	0	0	60	4	100	3	0	0
42	Otisville—A. W. N.	5	0	0	0	0	100	1	0	0	0	0	0	0	100	3	0	0	80	4	0	0	0	0	0	0	0	0	0	0
43	Ovid—O. B. C.	4	----	----	----	----	100	2	----	----	----	----	----	----	25	4	----	----	----	----	----	----	----	----	----	----	----	----	75	1
44	Vernon—D. C. H.	5	0	0	0	0	100	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	1	100	2
45	Webberville—R. B. S.	5	0	0	20	3	60	3	0	0	0	0	0	0	0	0	0	0	80	2	100	3	0	0	0	0	60	1	100	2
46	SOUTH-WESTERN DIV....†	*43*	*0*	*0*	*40*	*5*	*67*	*3*	*0*	*0*	*20*	*2*	*30*	*4*	*82*	*5*	*30*	*5*	*46*	*4*	*55*	*5*	*0*	*0*	*46*	*5*	*79*	*3*	*69*	*4*
47	Allegan—W. H. B.	5	0	0	0	0	100	6	0	0	0	0	0	0	80	7	20	6	20	8	0	0	0	0	40	7	100	3	100	4
48	Cassopolis—F. G.	5	----	----	40	5	60	4	----	----	----	----	20	6	100	4	40	3	100	1	----	----	----	----	----	----	60	4	----	----
49	Dayton—R. H.	5	0	0	0	0	20	3	0	0	0	0	0	0	20	3	0	0	40	4	40	4	0	0	60	3	100	2	60	3
50	Mattawan—T. H. B.	3	----	----	----	----	33	5	0	0	0	0	0	0	100	5	0	0	33	4	0	0	0	0	33	4	33	3	0	0
51	Niles—J. S. R.	5	0	0	0	0	100	2	0	0	0	0	0	0	100	9	0	0	0	0	60	9	0	0	0	0	60	7	80	8
52	Niles—*I. S.*	5	----	----	----	----	100	3	----	----	----	----	----	----	100	7	----	----	----	----	----	----	----	----	----	----	100	1	40	3
53	Otsego—M. C.	5	0	0	0	0	60	3	0	0	0	0	0	0	100	5	0	0	40	4	20	4	0	0	0	0	40	2	60	3
54	Paw Paw—J. A.	5	0	0	0	0	20	1	0	0	20	2	40	2	60	3	0	0	40	3	100	2	0	0	0	0	100	1	40	2
55	St. Joseph—R. F. S.	5	0	0	0	0	100	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	2	100	2
56	SOUTH'N-CENT. DIV.....†	*85*	*40*	*5*	*30*	*4*	*89*	*3*	*20*	*9*	*0*	*0*	*40*	*5*	*86*	*6*	*44*	*7*	*51*	*7*	*74*	*5*	*36*	*7*	*48*	*6*	*80*	*3*	*73*	*4*
57	Adrian—*A. M. S.*	5	----	----	40	4	100	2	0	0	0	0	0	0	40	4	0	0	0	0	60	4	0	0	0	0	100	2	40	4
58	Albion—A. M. D.	5	0	0	0	0	100	2	0	0	0	0	0	0	100	7	0	0	20	10	100	10	100	11	0	0	100	4	100	8
59	Battle Creek—*S. S F.*.*	5	----	----	20	10	100	8	----	----	----	----	----	----	60	8	20	10	60	8	100	4	20	10	60	10	20	2	100	1
60	Brooklyn—E. N. P.	5	----	----	20	1	60	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
61	Centreville—M. S.	5	0	0	20	4	100	2	0	0	0	0	0	0	20	5	0	0	60	4	0	0	0	0	20	4	100	2	100	2
62	Clinton—A. W. A.	5	0	0	0	0	100	3	20	12	0	0	0	0	100	9	20	6	20	8	40	6	20	8	40	11	80	3	100	8
63	Coldwater—*G. F. F.*	5	0	0	0	0	100	1	0	0	0	0	0	0	100	8	80	9	60	9	0	0	0	0	0	0	100	5	0	0
64	Hillsdale—*J. W. F.*....*	5	40	5	60	4	80	4	0	0	0	0	40	5	0	0	80	4	40	5	80	3	0	0	100	3	80	3	80	3
65	Jackson—Prison, E. L. K.	5	----	----	----	----	100	1	----	----	----	----	----	----	100	4	----	----	----	----	----	----	----	----	----	----	80	3	20	4
66	Jackson—W. W.	5	0	0	0	0	100	2	0	0	0	0	0	0	100	4	0	0	100	7	0	0	0	0	0	0	0	0	0	0
67	Kalamazoo—W. B. S.	5	0	0	0	0	40	6	0	0	0	0	0	0	100	7	0	0	0	0	0	0	0	0	0	0	100	1	100	2
68	Marshall—H. L. J.	5	0	0	0	0	100	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
69	Mendon—H. C. C.	5	0	0	0	0	100	2	0	0	0	0	0	0	100	5	0	0	0	0	0	0	0	0	0	0	100	2	40	4
70	Mendon—E. S.	5	0	0	0	0	100	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	3	0	0	40	2	0	0
71	Sturgis—N. I. P.	5	0	0	20	3	40	2	20	5	0	0	0	0	100	2	20	4	0	0	40	1	20	4	20	3	20	4	20	3
72	Three Rivers—C. W. B.	5	----	----	----	----	100	3	0	0	0	0	0	0	100	9	0	0	0	0	100	8	0	0	0	0	100	1	100	2
73	Union City—N. H. C.	5	0	0	0	0	100	5	0	0	0	0	0	0	100	7	0	0	0	0	0	0	0	0	0	0	100	1	0	0
74	SOUTH-EASTERN DIV...†	*53*	*80*	*11*	*72*	*10*	*90*	*4*	*0*	*0*	*0*	*0*	*20*	*4*	*92*	*6*	*50*	*7*	*83*	*7*	*64*	*8*	*60*	*15*	*60*	*10*	*78*	*4*	*68*	*5*
75	Detroit—L. C.	5	100	17	100	15	100	4	0	0	0	0	0	0	100	8	0	0	80	15	100	14	100	18	100	14	100	5	100	14
76	Detroit—*E. L.*	5	----	----	----	----	100	7	0	0	0	0	0	0	100	8	80	10	100	10	60	10	60	10	60	10	100	2	100	3
77	Detroit—W. H. R.	5	100	16	100	18	100	4	0	0	0	0	0	0	100	7	100	13	100	9	40	17	20	18	100	11	100	8	100	6
78	Milford—R. J.	5	----	----	----	----	100	3	----	----	----	----	----	----	20	4	20	5	100	4	----	----	----	----	----	----	100	2	----	----
79	Monroe—*A. J. M.*	4	----	----	----	----	25	6	0	0	0	0	0	0	100	6	100	6	0	0	0	0	0	0	0	0	0	0	50	3
80	Northville—J. M. S.	5	----	----	20	4	80	4	0	0	0	0	20	4	100	3	20	4	60	3	20	5	0	0	0	0	40	3	80	3
81	Trenton—W. C.	5	100	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	60	5	0	0	0	0	100	4	20	4
82	Utica—G. G. R.	5	0	0	60	7	100	5	0	0	0	0	0	0	100	6	20	8	0	0	0	0	0	0	20	6	0	0	0	0
83	Washington—A. Y.	5	20	4	80	6	100	1	0	0	0	0	0	0	100	5	0	0	60	6	40	4	0	0	20	6	60	5	0	0
81	Wyandotte—E. P. C.	5	0	0	0	0	80	2	0	0	0	0	0	0	100	4	20	5	80	3	100	3	0	0	0	0	20	4	20	5
85	Wyandotte—*T. J. L.*	4	----	----	----	----	100	2	0	0	0	0	0	0	100	6	0	0	0	0	100	4	0	0	0	0	0	0	0	0

*, †, ‡, §, ||. For explanations and references, see pages 390-1.

NOTE FOR SEPTEMBER.—September 11, 1879, Lee S. Cobb, of Nirvana, wrote: "Just now there is more sickness—of a malarious character—than all I have known in eight years' residence here."

TABLE 3.—*Diseases, by Localities in Michigan,* **December**, *1879, (Five Weeks ending Jan. 3, 1880)*—CONTINUED.

LINE NUMBER. ¶	Fever, Typhoid (Enteric.)		Fever, Typho-Malarial.		Influenza.		Measles.		Neuralgia.		Pneumonia.		Puerperal Fever.		Rheumatism.		Scarlatina.		Small-pox.		Tonsillitis.		Whooping-Cough.	
	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§	Per cent of Weeks Present.‡	Av. Order of Prevalence when Present.§
1	55	7.2	59	5.6	76	2.7	67	4.1	82	4.2	68	4.9	25	5.4	83	4.4	61	5.3	40	19.5	75	3.9	73	5.4
2	0	0	0	0	93	1	40	5	100	1	70	5	20	6	90	3	60	3	0	0	60	3	60	4
3	0	0	0	0	80	2	0	0	100	1	0	0	0	0	100	2	20	4	0	0	40	3	20	3
4	0	0	0	0	100	1	40	5	0	0	60	5	0	0	0	0	0	0	0	0	40	3	0	0
5	0	0	0	0	100	1	0	0	----	----	80	5	20	6	80	4	100	2	0	0	100	3	100	4
6	0	0	60	3	40	3	0	0	60	3	40	4	0	0	60	3	0	0	0	0	40	5	0	0
7	0	0	60	3	40	3	0	0	60	3	40	4	0	0	100	4	0	0	0	0	40	5	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	20	1	0	0	0	0	0	0	0	0
9	50	9	53	7	66	4	33	5	76	5	63	5	0	0	83	7	50	5	0	0	76	4	67	6
10	0	0	40	6	100	3	0	0	80	6	60	5	0	0	100	7	0	0	0	0	80	5	0	0
11	0	0	0	0	40	2	0	0	100	3	0	0	0	0	100	4	0	0	0	0	60	3	0	0
12	50	5	0	0	25	4	50	4	25	5	50	4	0	0	75	6	50	5	0	0	25	4	25	7
13	20	8	20	2	20	7	----	----	60	6	80	5	----	----	100	4	----	----	----	----	80	4	----	----
14	0	0	0	0	100	1	20	5	100	4	60	5	0	0	20	7	0	0	0	0	100	3	0	0
15	80	13	100	14	100	8	0	0	80	5	0	0	0	0	100	11	0	0	0	0	100	4	100	5
16	----	----	40	3	----	----	----	----	20	4	20	3	----	----	40	2	----	----	----	----	40	2	20	4
17	----	----	40	3	----	----	----	----	20	4	20	3	----	----	40	2	----	----	----	----	40	2	20	4
18	57	9	42	7	82	3	60	6	100	5	84	5	25	5	79	5	64	5	0	0	82	4	55	6
19	0	0	0	0	100	2	20	8	100	8	100	7	0	0	100	7	0	0	0	0	100	3	20	9
20	----	----	----	---	----	----	----	----	----	----	100	3	----	----	20	3	----	----	----	----	20	3	----	----
21	0	0	0	0	0	0	0	0	100	4	75	4	25	5	100	4	0	0	0	0	100	2	0	0
22	50	13	25	4	100	2	0	0	100	9	75	3	0	0	75	5	75	7	0	0	75	9	0	0
23	0	0	60	4	0	0	0	0	100	5	80	5	0	0	20	7	100	5	0	0	----	----	100	6
24	---	----	----	----	60	2	----	----	----	----	----	----	----	----	80	1	----	----	----	----	----	----	----	----
25	40	9	60	11	100	4	0	0	100	3	100	8	0	0	100	5	0	0	0	0	100	5	20	7
26	80	5	0	0	20	4	0	0	100	2	40	6	0	0	100	3	0	0	0	0	60	5	80	3
27	0	0	20	7	100	1	0	0	100	5	0	0	0	0	100	5	20	2	0	0	100	5	0	0
28	0	0	0	0	100	5	100	3	100	4	100	4	0	0	100	5	0	0	0	0	100	2	0	0
29	56	6	56	6	73	3	70	7	82	4	67	4	20	9	74	4	60	3	0	0	76	4	75	4
30	0	0	0	0	100	3	0	0	100	6	40	6	0	0	60	6	0	0	0	0	60	8	0	0
31	100	11	60	11	100	3	0	0	100	3	100	3	0	0	100	5	0	0	0	0	0	0	100	10
32	40	10	0	0	0	0	60	9	100	3	100	6	0	0	100	4	0	0	0	0	100	2	0	0
33	0	0	40	3	0	0	0	0	0	0	80	4	0	0	0	0	0	0	0	0	40	5	0	0
34	0	0	0	0	20	3	0	0	20	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
35	100	8	0	0	100	2	0	0	100	2	100	5	20	9	100	4	0	0	0	0	80	7	100	6
36	0	0	0	0	0	0	0	0	100	3	60	4	0	0	60	3	0	0	0	0	100	2	0	0
37	20	5	40	7	100	3	0	0	0	0	20	7	0	0	60	5	0	0	0	0	0	0	100	1
38	----	----	60	3	20	1	----	----	40	2	20	3	----	----	80	1	20	2	----	----	----	----	----	----

Line	DISEASES REPORTED WHICH WERE NOT PRINTED ON THE BLANKS, AMOUNT OF SICKNESS, ETC. ¶	Per ct. of Weeks Pres.‡	Av. Ord. of Prev. when Pres.§
3	Considerable throat trouble, pharyngitis, etc., Jan. 5, 1880.	20 60	5 5
4	Pleurisy	80	5
	Bright's Disease		
	Cancer stomach		
	Epizootic prevalent with horses, Dec. 6.		
7	Gastritis	20	2
11	Dyspepsia	60	3
	Hysteria and cystitis, each	20	3
	Gastritis	40	5
12	Croup	25	4
17	Very healthy; diphtheria has entirely subsided, Dec. 31.		
19	Not much change, 3 weeks ending Dec. 20. Colds, cough, sneezing, with intermittent ———, Dec. 13 Mucous irritations about the throat and lungs, with periodical fever, Dec. 27. Irritations of the air-passages more numerous than all other acute ailments, Jan. 3.		
20	Very little sickness, Dec. 13.		
21	Not much sickness, Jan. 3.		
25	The death-rate of diphtheria is 50 per cent, though not many cases, Dec. 20.		
	Spasmodic croup	20	10
	Cathar. ventric.	20	5
	Dyspepsia	20	6
26	Very little sickness, Dec. 6 and 13. Very healthy, except some diphtheria, Dec. 20. Very little sickness except diphtheria, which is very fatal for number of cases, Dec. 27. Very healthy generally, Jan. 3.		
28	Laryngitis	20	7
	See note, "line 28" for Dec., page 427.		
31	Have seen more cases of rheumatism during the last month than ever before in one month, Dec. 30.		
	Lithiasis	20	7
	Spasmodic croup	40	7

39	100	3	0	0	100	5	0	0	100	6	100	5	0	0	100	6	100	1	0	0	100	4	100	4
40	20	6	0	0	100	4	0	0	0	0	100	5	0	0	60	5	0	0	0	0	0	0	20	2
41	0	0	0	0	0	0	0	0	80	4	80	4	0	0	20	3	40	4	0	0	80	4	40	1
42	20	6	0	0	0	0	80	5	100	4	0	0	0	0	100	5	0	0	0	0	20	3	80	2
43	50	1	----	----	----	----	----	----	----	----	50	3	----	----	----	----	----	----	----	----	----	----	50	4
44	0	0	80	4	0	0	0	0	100	5	60	5	0	0	100	6	100	5	0	0	100	4	0	0
45	0	0	0	0	20	2	0	0	40	2	20	2	0	0	20	3	40	3	0	0	80	3	80	3
46	*20*	*6*	*70*	*3*	*71*	*3*	*20*	*12*	*89*	*4*	*65*	*4*	*40*	*4*	*84*	*4*	*68*	*3*	*0*	*0*	*76*	*4*	*100*	*5*
47	20	4	0	0	100	2	0	0	80	5	40	8	0	0	20	8	100	1	0	0	0	0	0	0
48	----	----	----	----	100	2	----	----	100	5	60	4	----	----	100	5	20	3	----	----	100	4	----	----
49	0	0	0	0	0	0	0	0	100	2	0	0	40	4	60	3	0	0	0	0	100	2	0	0
50	0	0	0	0	100	1	0	0	100	3	100	4	0	0	100	2	0	0	0	0	100	2	0	0
51	0	0	0	0	100	5	20	12	100	6	100	3	0	0	100	7	100	4	0	0	100	5	100	10
52	20	7	----	----	20	4	----	----	100	5	----	----	----	----	100	6	100	4	----	----	40	9	100	5
53	0	0	0	0	60	3	0	0	40	2	0	0	0	0	80	3	0	0	0	0	20	4	0	0
54	0	0	40	2	80	2	0	0	100	2	40	2	0	0	100	3	0	0	0	0	100	2	100	1
55	0	0	100	3	20	2	0	0	0	0	0	0	0	0	100	2	20	4	0	0	60	1	0	0
56	*53*	*7*	*63*	*6*	*80*	*2*	*0*	*0*	*77*	*4*	*67*	*5*	*20*	*3*	*89*	*4*	*40*	*7*	*0*	*0*	*73*	*4*	*47*	*7*
57	0	0	0	0	60	2	0	0	80	3	40	4	0	0	60	3	80	4	0	0	60	4	0	0
58	20	9	40	13	100	1	0	0	100	6	100	8	----	----	100	7	20	9	0	0	100	4	0	0
59	100	3	100	2	----	----	----	----	80	9	60	10	----	----	100	6	----	----	----	----	100	5	----	----
60	----	----	----	----	----	----	----	----	----	----	40	2	----	----	----	----	----	----	----	----	20	1	----	----
61	0	0	0	0	60	4	0	0	100	2	40	5	0	0	100	3	0	0	0	0	80	2	20	2
62	40	8	20	8	0	0	0	0	100	1	100	5	0	0	100	5	0	0	0	0	100	5	0	0
63	0	0	0	0	0	0	0	0	100	4	100	6	0	0	100	3	40	9	0	0	100	2	100	8
64	0	0	20	2	80	2	0	0	100	2	40	4	0	0	100	3	0	0	0	0	60	5	0	0
65	----	----	----	----	----	----	----	----	----	----	----	----	----	----	100	2	----	----	----	----	100	3	----	----
66	0	0	0	0	100	1	0	0	80	6	100	3	0	0	100	5	40	8	0	0	0	0	0	0
67	0	0	100	6	100	3	0	0	0	0	100	5	0	0	0	0	0	0	0	0	100	4	0	0
68	0	0	0	0	40	2	0	0	40	4	0	0	0	0	100	3	0	0	0	0	100	3	0	0
69	0	0	0	0	0	0	0	0	60	4	0	0	0	0	60	4	0	0	0	0	20	4	0	0
70	0	9	0	0	0	0	0	0	20	3	0	0	0	0	0	0	0	0	0	0	60	2	0	0
71	0	0	0	0	0	0	0	0	20	3	40	1	20	3	20	4	20	4	0	0	20	2	20	10
72	0	0	0	0	100	4	0	0	100	5	40	9	0	0	100	7	40	9	0	0	40	9	0	0
73	0	0	100	2	0	0	0	0	100	4	0	0	0	0	100	5	0	0	0	0	100	4	0	0
74	*75*	*8*	*74*	*7*	*77*	*2*	*88*	*2*	*82*	*5*	*70*	*6*	*0*	*0*	*96*	*5*	*79*	*8*	*40*	*19*	*83*	*4*	*100*	*8*
75	0	0	100	12	100	2	100	2	100	6	100	11	0	0	100	5	100	11	40	20	100	4	100	8
76	100	10	100	8	100	3	100	1	100	4	100	8	0	0	100	5	100	8	0	0	100	6	100	10
77	100	14	0	0	100	2	100	1	100	11	100	8	0	0	100	6	100	13	40	19	100	3	100	18
78	80	4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	100	1
79	0	0	75	2	25	3	0	0	100	4	100	1	0	0	100	7	100	6	0	0	0	0	0	0
80	0	0	0	0	80	1	0	0	20	5	20	4	0	0	100	2	0	0	0	0	20	5	0	0
81	0	0	0	0	40	3	100	1	100	5	20	4	0	0	100	6	0	0	0	0	60	7	100	2
82	0	0	0	0	100	1	20	3	100	3	100	5	----	----	100	4	0	0	0	0	100	2	0	0
83	0	0	20	4	80	4	0	0	100	4	40	7	0	0	100	2	40	4	0	0	100	4	0	0
84	20	4	0	0	0	0	100	1	20	4	60	3	0	0	60	4	40	5	0	0	0	0	0	0
85	0	0	0	0	50	3	100	2	----	----	0	0	0	0	100	5	0	0	0	0	----	----	0	0

32	Metrorrhagia and gonorrhea, each	60	9
	Dysmenorrhea and valvular disease of heart, each	20	9
	Anemia	40	3
34	See note "Line 34," below.		
36	Asthma	20	4
	See note 36 for Dec., p. 429.		
44	No prevailing sickness; a few very mild sporadic cases of scarlatina, Dec. 20. Generally very healthy; scarlatina so far very mild, Dec. 27. The year 1879 has been one of unusual general health; no epidemics have prevailed, and all endemic diseases have been unusually mild, Jan. 6, 1880.		
47	The typhoid fever was confined to one family; three were attacked, of whom two have died, Jan. 3.		
49	Chronic pericarditis	20	4
53	Not much sickness, Dec. 6.		
	Pharyngitis	20	1
	Traumatic tetanus	20	6
54	Endocervicitis	20	1
	Gastralgia	40	3
	Chicken-pox	40	2
	Roseola, apoplexy, epilepsy, hepatitis, tape-worm, urticaria, hydatids, gonorrhea, and hematuria, each	20	3
	Chorea	60	3
	Cystitis	20	2
	Hemorrhoids	40	3
55	No sickness, 2 weeks ending Dec. 27.		
57	Peritonitis	40	4
59	Mild throat-trouble prevails, Dec. 6.		
65	Syphilis	100	5
66	Sickness light, Dec. 6.		
69	Mumps	20	1
72	Pharyngitis	100	7
	Catarrh	80	7
	Continues healthy.		
76	Mumps	100	9
77	Chicken-pox	20	21
	Measles of a mild type and throat diseases quite prevalent.		
80	Sore throat	60	3
	Chronic cases only, Dec. 6. Total change in condition of health with change in weather, Dec. 13. Everybody complaining with all sorts, Dec. 20.		
83	Dyspepsia	100	2
	Malaria	100	5
	Disease of heart	40	7

‡, §. For explanations and references see pages 390-1.

¶ The several numbered lines on these two pages continue statements for the localities and divisions which are named and have the same line-numbers on the two preceding pages; on the right side of the page the numbers before the side-notes are the line-numbers of the localities, on pages 430-1, to which the side-notes refer.

Line 34. Case of peritonitis following an inflamed ovary, Dec. 6; convalescent, Dec. 20.

ADDITIONAL NOTES.

For want of room on the same pages with the table some of the longer notes to Table 3 are printed here. The figures before the notes are the line numbers of the localities, on preceding pages, to which the notes refer. The names of the localities, designated by the same numbers, may be found on pages named below in the heading of the "additional notes" for each month.

ADDITIONAL NOTES FOR FEBRUARY. (*Ending March 1. See pages 390-1.*)

Line-Number 64.—The variation in severity of our scarlatina is worthy of note. As the temperature lowers the disease notably increases; a few fine days and no new cases seem to develop themselves. There are now but six or seven cases in the city, of a mild character and easily handled. Diphtheria has attacked some few cases of scarlatina, *always fatally*. Hygiene seems to afford no immunity from attack. The worst cases of scarlatina (not complicated with diphtheria) seem to get well under the most unfavorable circumstances. I have had 56 cases, with three deaths. Feb. 22 and 26. Scarlatina abating, March 1.—*E. Batwell, M. D., of Ypsilanti.*

Line-Number 74.—In the reports for past two or three weeks you find besides influenza, also bronchitis and pneumonia very prevalent; the latter are in fact aggravated cases of influenza from neglect, running into more serious conditions, at least arise (as I suppose) from same epidemic cause; there never was such general epidemic influenza with us and, as far as I can learn, wide spread; rheumatism and neuralgia also very prevalent, probably from same epidemic cause. A peculiarity of many cases of pneumonia is that as the pneumonia yields, rheumatism manifests itself The pneumonia presents all physical signs, even the bloody or prune-juice expectoration, Feb. 17.—*E. P. Christian, M. D, of Wyandotte.*

February 28, 1879, Lee S. Cobb, of Nirvana, wrote: "A great many in this vicinity are complaining of severe 'colds.' Some of them are quite sick."

ADDITIONAL NOTES FOR MAY. (*See pages 402-3.*)

Line-Number 41.—So little sickness I almost forget to report. A few cases of slight indisposition, of malarial origin, and a little sickness among children referable to digestive troubles is all —May 15. No prevailing disease —May 31.—*D. C. Holly, M. D., of Vernon.*

Line-Number 48.—For the past 8 months there has been present an influenza, prevailing in the air passages, or respiratory tract, being completely invaded in a few cases; sometimes the mouth and tonsils only are attacked; in other cases the pharynx and larynx; in a few cases the larynx and trachea; and in other cases the trachea and bronchi. I have examined over 100 cases critically and could not discover the slightest trace of diphtheritic exudation. Within the past 3 or 4 weeks the disease has invaded the chest, and there are more cases of bronchitis, pneumonia, and broncho-pneumonia. I have not had a fatal case.—May 24. The falling off in the quantity of ozone as compared with several months previous is considerable. I notice also that there is a decline in the number of cases of disease of the respiratory passages. Diseases of the nasal passages, throat, bronchi, and lungs have in a great measure disappeared, and consumption is held in abeyance. Intermittent fever is on the increase.—About June 1.—*J. S. Reeves, M. D., of Niles.*

ADDITIONAL NOTES FOR JUNE. (*See pages 406-7.*)

Line-Number 28.—Many cases of cough both with old and young, more particularly the latter, resembling whooping cough, only there is no "whoop;" they are probably due to causes producing influenza, June 7.—*I. E. Randall, M. D., of West Bay City.*

Line-Number 71.—Sickness light June 14. I have observed that the presence of a distinctive form of phthisis has been greater this spring and up to this date than ever before. Rheumatism has been more general during May than any other month of the last year, June 12.—*W. Worsfold, M. D., of Jackson.*

ADDITIONAL NOTES FOR JULY. (*Ends Aug. 2. See pages 410-11.*)

Line-Number 26.—Very warm weather, with an increase of sickness, July 12. Increase in bowel complaints, principally among children, with a large number of deaths in proportion to amount of sickness, July 19. Whooping cough came from Zilwaukee, July 26. Cholera infantum quite fatal, Aug. 2.—*N. D. Lee, M. D., of Saginaw City.*

Line-Number 65.—Small pox patient recovered without communicating the disease; intermittents more frequent and more obstinate, July 5. Malarial diseases on the increase, July 26.—*S. S. French, M. D., of Battle Creek.*

Line-Number 78.—Continues healthy, 3 weeks ending July 19. Sickness on the increase, July 26. Not sickly for this season, Aug. 2.—*C. W. Backus, M. D., of Three Rivers.*

Line-Number 80.—A large increase of illness, July 12. Many cases of consumption are developed, July 19. Intermittents prevail extensively; the Huron River is very low, and many of our wells are drying up. The rainfall has been large, and the question is what has become of the water?—*E. Batwell, M. D., of Ypsilanti.*

ADDITIONAL NOTES FOR AUGUST. (*See pages 414-5.*)

Line-Number 26.—The tendency to disease during the latter part of April and up to the middle of May was lung and throat disease, *mild;* after this, up to the middle of July, scarcely any sickness; from the middle of July to the present time the tendency has been to bowel complaints, mostly with children; at present a few cases of intermittent fever with torpid action of the liver; no serious sickness, however, Aug. 18.—*J. M. Loop, M. D., of Port Sanilac.*

NOTES FOR SEPTEMBER.—(*See pages 418-21.*)

"There have been to my knowledge three cases of sore throat among children—called diphtheria by attending physicians—none serious.

"There have been also three cases of typhoid fever—so called popularly here—one of which was fatal. These cases are among the saw-mill hands. The physicians are not agreed in regarding this as genuine typhoid fever. Some hold it to be a kind of gastric fever. Death, however, is frequently caused by perforation of bowels, as in two cases at which I was present in one season. There is no danger from contagion, each case running its course without affecting other persons. These fevers set in about September 15, and continue until into November. They occur usually among saw-mill hands, men from 19 to 30 years old, average. In the cases I have seen, some seven or eight, perhaps more, there is stupor, more or less trembling and nervous twitching of muscles, constipation, dry lips and tongue and teeth foul, a dry and hot skin, particularly palms of hands, which seem greedily to absorb moisture; no marked distention of abdomen, and no eruption. Cases run from four to six weeks between taking to bed and sufficient convalescence to be out. A fatal termination reveals itself in one or two weeks In one case the perforation of bowel was very sudden and unexpected. Generally, however, diarrhœa comes on, patient sinks, stools are involuntary and may be mixed with blood, nose bleeds sometimes, blood sometimes spit up, and death occurs. I do not pretend to professional knowledge, and only give unprofessional observations so far as within my notice.

"Since my residence here, embracing five years, there have been fatal cases of scarlet fever and diphtheria, and these cases of so-called typhoid, but they have never been epidemic. Measles and whooping cough, however, have spread throughout the village.

"This month has been unusually healthy, the most so of any September since I have lived here. As you may notice, the range of the barometer has not equaled an inch. The ozone very light, the temperature quite equable. The ground very dry; usually the water stands in the swamps stagnant all summer, but the swamps (there are three of them in town) are now dry."—*Rev. A. W. Bill, of Menominee, on September (1879) Meteorological Register.*

DISEASES WHICH CAUSE MOST SICKNESS.

One important question which these statistics of sickness enable us to answer is: What disease causes most sickness in Michigan? The reply for the year 1879 is that intermittent fever, commonly called ague, caused in this State in that year more sickness than did any other disease; and the last Report showed that the evidence on this point was the same for the year 1878. It must not be understood from this evidence that intermittent fever causes many deaths,—that is quite another question; for that kind of information we are indebted to the Vital Statistics of Michigan, wherein is compiled the returns made by supervisors relating to the deaths in each year.

What are the principal diseases which cause most sickness in Michigan? Naming them in the order of their prevalence, those from which there appears to have been the most sickness first, they were, in 1879, as follows: Intermittent fever, rheumatism, bronchitis, remittent fever, influenza, consumption of the lungs, neuralgia, diarrhea, tonsilitis, and inflammation of the lungs. From the reports it appears that each of these diseases caused more sickness than the average amount from the 24 diseases which are considered of sufficient importance to be included regularly in the tables in this Report. The order of prevalence is substantially, though not precisely, the same as in 1878, when, according to the last Report, it was as follows: Intermittent fever, bronchitis, rheumatism, consumption, remittent fever, influenza, diarrhea, and inflammation of the lungs. But in 1878 neuralgia and tonsilitis were not as fully reported as in 1879, it is believed, because these diseases were not printed on all the cards used during 1878, and thus the attention of observers was not so much called to them as it was during the year 1879. From Exhibit 24 it will be seen that in 1879 both these diseases appear to have caused more sickness than did pneumonia (inflammation of the lungs), neuralgia causing more than did diarrhea; it seems probable that the same might have been true in 1878 if the attention of the observers had been as strongly attracted to those diseases in that year as it was in 1879. Comparing Exhibit 24 in this Report with the similar exhibit (A) in last Report, it may be seen that though the figures for consumption are not very different for 1879 from those for 1878, it is placed 6 in order in 1879, while in 1878 it was 4, being pushed down in 1879 by the two diseases, remittent fever and influenza, which are now thought to be properly so placed, though the figures are not very different in 1879 from those in 1878. In Exhibit 24, after the first-mentioned disease, intermittent fever, the place of which is unquestionable because both lines of evidence show it unmistakably, the positions of the other diseases in the order may be questioned, each person being entitled to weigh the evidence, which is therefore stated in the exhibit. The order in which they are placed is the one which seems to the compiler to be indicated by the figures. The mode of obtaining the figures for Exhibits 24 and 25 is explained as follows:

Exhibit 24, below, is made from Table 2 for the State, by a comparison of the per cent of reports on which the several diseases were reported present, their average order of prevalence when present, the per cent of observers by whom the diseases were reported, and the time, or average per cent of weeks, they were reported present where present,—statements found in the first four figure-columns of Table 2, pages 376–9. Exhibit 25 was made from Table 4, page 438, in the same way as Exhibit 24 from Table 2.

EXHIBIT 24.—*Diseases from which there seems to have been the Most Sickness in Michigan in 1879, as indicated by the Per Cent of Weekly Reports stating Presence of the Diseases, as studied in connection with the Average Order of Prevalence of said Diseases when reported present.*

ORDER.*	DISEASES IN ORDER OF APPARENT AMOUNT OF SICKNESS, MOST PREVALENT ONE FIRST.	Per Cent of Reports Stating Presence of. *d*	Av. Order of Preva-l'nce when Present. *e*
1	Intermittent Fever	82	2.2
2	Rheumatism	72	4.6
3	Bronchitis	64	3.6
4	Remittent Fever	57	3.3
5	Influenza	45	3.1
6	Consumption, Pulmonary	70	5.6
7	Neuralgia	59	4.5
8	Diarrhea	48	4.4
9	Tonsilitis	45	4.5
10	Pneumonia	41	5.2
	Average of 24 diseases	33	4.7
11	Diphtheria	29	5.4
12	Scarlatina	23	5.5
13	Whooping-cough	23	5.5
14	Typho-malarial Fever	22	5.8

* Judging from the per cent of reports which stated presence of the diseases, in connection with the order of prevalence when prevalent.

d, *e* See foot-notes with these marks on page 375. The greatest relative prevalence was marked 1 on the card-reports.

Remarks on Exhibit 24 are printed on pages 435–6. An idea of the comparative prevalence of diseases may also be obtained by an examination of Diagrams 1, 2, 3, and 4, on following pages; the diagrams being accurately drawn to scale, the distance from the bottom of the diagram to the line representing the disease indicates the prevalence of the disease in each month, the per cent, of all reports received, which state that disease to be present being found by referring to the column at the left of the diagram.

In Exhibit 25, perhaps the most noticeable features are:—the extreme prevalence of intermittent fever, and the great prevalence of bronchitis, in the Bay and Eastern Division; and the great prevalence of remittent fever in the Western Division of the State.

EXHIBIT 25.—*By Six (of eleven) Geographical Divisions* of the State, the Diseases from which there seems to have been the Greatest Amount of Sickness in 1879, as indicated by the Per Cent of Weekly Reports stating Presence of each of 24 Leading Diseases as studied in connection with the Average Order of Prevalence of said Diseases when reported present.*

Order.†	Diseases in order of Apparent Amount of Sickness, Most Prevalent one first.	Per Cent of Reports Stating Presence of.[d]	Av. Order of Prevalence where Present.[e]	Diseases in order of Apparent Amount of Sickness, Most Prevalent one first.	Per Cent of Reports Stating Presence of.[d]	Av. Order of Prevalence where Present.[e]	Diseases in order of Apparent Amount of Sickness, Most Prevalent one first.	Per Cent of Reports Stating Presence of.[d]	Av. Order of Prevalence where Present.[e]
	Western Division.*			Bay and Eastern Div.*			Central Division.*		
1	Intermittent Fever	82	2.7	Intermittent Fever	96	1.7	Intermittent Fever	81	2.0
2	Remittent Fever	83	2.8	Bronchitis	81	3.7	Remittent Fever	62	3.0
3	Influenza	55	3.5	Influenza	49	3.8	Bronchitis	56	3.9
4	Neuralgia	73	5.0	Rheumatism	79	4.7	Diarrhea	47	3.8
5	Bronchitis	65	5.0	Remittent Fever	62	4.1	Influenza	39	3.2
6	Rheumatism	74	6.1	Neuralgia	63	4.8	Neuralgia	55	4.4
7	Tonsilitis	58	5.0	Diarrhea	50	4.1	Rheumatism	61	4.7
8	Diarrhea	46	5.0	Tonsilitis	47	4.7	Consumption, Pulmonary	71	5.5
9	Pneumonia	40	5.0	Consumption, Pulmonary	74	6.0	Tonsilitis	39	4.6
10	Diphtheria	43	5.3	Pneumonia	50	5.8	Diphtheria	31	4.8
11	Consumption, Pulmonary	42	7.7	Diphtheria	39	6.0	Pneumonia	38	5.1
12	Erysipelas	47	7.4	Measles	29	3.5	Whooping-cough	24	4.4
	Av. of 23 Diseases.	40	5.4	Av. of 24 Diseases.	38	4.8	Av. of 24 Diseases.	31	4.3
	South-Western Div.*			Southern-Central Div.*			South-Eastern Div.*		
1	Intermittent Fever	86	2.3	Intermittent Fever	86	2.2	Intermittent Fever	83	2.7
2	Remittent Fever	52	2.7	Bronchitis	65	2.8	Bronchitis	72	3.5
3	Influenza	46	3.0	Rheumatism	72	4.5	Influenza	59	3.3
4	Neuralgia	61	3.8	Remittent Fever	57	3.3	Remittent Fever	59	3.8
5	Rheumatism	75	4.0	Influenza	36	2.8	Rheumatism	81	4.7
6	Bronchitis	54	3.8	Neuralgia	54	4.4	Neuralgia	60	5.4
7	Tonsilitis	39	3.8	Diarrhea	44	4.3	Consumption, Pulmonary	89	5.8
8	Diarrhea	41	4.0	Tonsilitis	47	4.6	Tonsilitis	48	5.3
9	Diphtheria	31	3.8	Consumption, Pulmonary	68	5.8	Diarrhea	60	6.3
10	Consumption, Pulmonary	74	4.7	Pneumonia	34	5.0	Pneumonia	57	6.4
11	Pneumonia	33	4.5	Whooping-cough	21	5.5	Scarlatina	45	6.3
							Measles	30	5.8
	Av. of 23 Diseases.	31	3.9	Av. of 24 Diseases.	30	4.5			
							Av. of 24 Diseases.	40	5.8

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*For counties in each division see Exhibit 1, page 227.

†Judging from the per cent of reports in connection with the "average order of prevalence where prevalent."

[d], [e]. See foot-notes with these marks on page 375.

TABLE 4.—*Exhibiting for each of the Six Geographical Divisions of the State from which the most weekly reports were received, a Summary relative to the Diseases in 1879.—indicating the Prevalence as regards both Time and Area.—A summary for the year from statements on pages* 381–3, *and on pages* 386–433.

DISEASES.	WESTERN DIVISION.*				BAY AND EASTERN DIVISION.*				CENTRAL DIVISION.*				SOUTH-WESTERN DIVISION.*				SOUTHERN-CENTRAL DIVISION.*				SOUTH-EASTERN DIVISION.*			
	Per Cent of Observers Reporting Presence of.b	Av. Per Cent of Weeks Reported Present where Present.c	Per Cent of Reports Stating Presence of.d	Av. Order of Prevalence where Present.e	Per Cent of Observers Reporting Presence of.b	Av. Per Cent of Weeks Reported Present where Present.c	Per Cent of Reports Stating Presence of.d	Av. Order of Prevalence where Present.e	Per Cent of Observers Reporting Presence of b	Av. Per Cent of Weeks Reported Present where Present.c	Per Cent of Reports Stating Presence of.d	Av. Order of Prevalence where Present.e	Per Cent of Observers Reporting Presence of.b	Av. Per Cent of Weeks Reported Present where Present.c	Per Cent of Reports Stating Presence of.d	Av. Order of Prevalence where Present.e	Per Cent of Observers Reporting Presence of.b	Av. Per Cent of Weeks Reported Present where Present.c	Per Cent of Reports Stating Presence of d	Av. Order of Prevalence where Present.e	Per Cent of Observers Reporting Presence of.b	Av. Per Cent of Weeks Reported Present where Present.c	Per Cent of Reports Stating Presence of.d	Av. Order of Prevalence where Present.e
Av. for Tabulated Diseases Reported Present	53	75	40	5.4	50	75	38	4.8	42	72	31	4.3	43	70	31	3.9	40	74	30	4.5	49	82	40	5.8
Bronchitis	79	81	65	5.0	86	93	81	3.7	72	77	56	3.9	70	73	54	3.8	74	86	65	2.8	77	93	72	3.5
Cerebro-spinal Meningitis	6	31	2	9.8	7	40	3	7.1	3	23	1	6.8	5	33	2	4.0	5	53	3	8.0	4	77	3	9.8
Cholera Infantum	29	59	16	6.8	28	60	16	5.4	28	67	19	5.3	17	51	9	4.9	15	51	8	5.4	20	69	14	7.1
Cholera Morbus	52	66	33	7.1	31	68	21	5.4	36	52	19	5.4	37	52	19	4.1	30	57	17	5.3	32	60	19	6.2
Consumption, Pulmonary	48	86	42	7.7	82	88	74	6.0	80	89	71	5.5	83	89	74	4.7	76	89	68	5.8	92	97	89	5.8
Croup, Membraneous	12	48	5	7.0	26	35	9	6.6	12	32	4	5.9	19	36	7	5.1	11	38	4	6.6	21	56	12	8.9
Diphtheria	59	73	43	5.3	61	64	39	6.0	48	63	31	4.8	51	59	31	3.8	33	53	18	5.5	45	72	33	7.6
Diarrhea	62	73	46	5.0	71	72	50	4.1	63	75	47	3.8	62	66	41	4.0	58	75	44	4.3	71	81	60	6.3
Dysentery	47	62	29	6.9	38	52	20	5.8	25	57	14	5.1	20	52	11	4.4	26	55	15	5.8	40	66	26	9.4
Erysipelas	62	76	47	7.4	40	63	26	6.3	38	50	19	5.4	38	47	18	4.8	37	52	19	6.3	48	73	36	9.8
Fever, Intermittent	91	90	82	2.7	98	97	96	1.7	90	91	81	2.0	93	91	86	2.3	95	92	86	2.2	90	92	83	2.7
Fever, Remittent	91	92	83	2.8	75	81	62	4.1	76	83	62	3.0	67	75	52	2.7	71	80	57	3.3	67	88	59	3.8
Fever, Typhoid (Enteric)	21	58	12	9.5	19	48	9	7.3	21	65	14	5.3	6	30	2	9.7	11	57	6	6.0	32	80	26	8.8
Fever, Typho-malarial	33	71	23	7.3	50	59	30	6.1	28	60	17	5.8	28	69	19	3.4	26	66	17	5.7	37	79	30	7.1
Influenza	73	75	55	3.5	59	82	49	3.8	51	76	39	3.2	62	73	46	3.0	46	78	36	2.8	68	86	59	3.3
Measles	24	68	16	5.1	39	72	29	3.5	11	52	5	4.6	6	48	3	6.0	4	58	2	3.6	36	80	30	5.8
Neuralgia	91	80	73	5.0	73	85	63	4.8	73	75	55	4.4	78	79	61	3.8	70	78	54	4.4	71	80	60	5.4
Pneumonia	61	67	40	5.0	67	73	50	5.8	59	64	38	5.1	55	59	33	4.5	49	69	34	5.0	71	80	57	6.4
Puerperal Fever	14	41	5	7.0	8	27	2	7.8	8	43	4	4.7	3	29	1	5.0	8	41	3	6.6	10	51	5	11.6
Rheumatism	86	84	74	6.1	93	85	79	4.7	78	78	61	4.7	89	84	75	4.0	83	86	72	4.5	89	91	81	4.7
Scarlatina	53	63	32	6.5	33	55	18	6.1	24	55	14	4.2	24	56	14	5.0	33	57	19	6.0	56	80	45	6.3
Small pox	0	0	0	0	2	41	1	6.0	1	25	0.1	6.0	0	0	0	0	0.5	50	0.1	7.0	4	36	1	14.0
Tonsilitis	85	68	58	5.0	62	74	47	4.7	63	63	39	4.6	67	58	39	3.8	67	69	47	4.6	66	72	48	5.3
Whooping-cough	39	75	33	6.5	45	66	31	5.5	32	73	24	4.4	17	65	12	5.3	27	75	21	5.5	25	82	21	9.0

* For counties in each division see Exhibit 1, page 227. b, c, d, e, See foot-notes with these marks on page 375.

Table 4, giving a summary for the year 1879, for each of the six geographical divisions of the State from which the most reports were received, has been made from Table 3, pages 386–433, in the same manner as Table 2, pages 374–5, which gives a summary for the State for the year. Table 3 was made directly from the card-reports. Table 4 is on page 438.

For convenience of reference in connection with Diagrams 1, 2, 3, and 4, Exhibit 26, page 440, brings together from Table 2, pages 376–9, statements by months of the per cent of card-reports on which each of the 24 diseases tabulated was reported present. It also gives statements for the years 1877–8–9.

DIAGRAMS OF SICKNESS IN 1879.

Curved or angling lines, in diagrams 1, 2, 3, and 4, represent approximately the course of the sickness in Michigan during the year 1879 from each of the prominent diseases. The rise of the line corresponds to increased prevalence of the disease represented by the line. and the fall of the line indicates corresponding decrease in its prevalence. The diagrams are accurately drawn to scale, so that the relative amount of sickness from each disease in each month of the year may easily be appreciated from a careful study of the diagrams alone. It is well to remember that they are based upon statements of facts as to the presence or absence of the diseases mentioned, under the observation of a large number of prominent physicians practicing in different parts of the State. To each physician who reports, the question whether a given disease did or did not occur under his observation during any given week, is a simple one, easily answered; and, for the diagrams employed in this article, only such answers are required. It is possible to gain, in this way, knowledge of the causes of sickness which is far in advance of any which has ever been gained before in this or any other country.

The diagrams of sickness need to be compared with similar diagrams representing each of the principal meteorological conditions in Michigan at the same time the sickness occurred. Such diagrams have been prepared, and are to be found on pages 316–363, preceding this article.

No one can examine Diagram 1, relative to sickness, without seeing that there are two very strongly-marked classes of diseases which bear close relations to the temperature, and to other conditions of the air which are represented in diagrams on preceding pages. Sickness from one of these classes of diseases generally increases when the temperature rises; from the other class sickness generally increases when the temperature falls. Sometimes the increase or decrease in the sickness lags a little behind the rise or fall in the temperature, suggesting the idea that the effects *follow* their causes; thus by Diagram I., page 316, it may be seen that the temperature was highest in July; and by Diagram 1, page 441, it may be seen that all the diseases, sickness from which increased nearly with the rise of temperature, were most prevalent in August, and one of the diseases (pneumonia), sickness from which decreased nearly with the rise of temperature, was lowest in August, the month following the one of highest temperature. There are, however, instances in which the rise or fall of the temperature is coincident with a corresponding rise or fall in the line representing sickness from a disease; thus the marked fall in temperature in February, 1879, shown on Diagram I., page 316, corresponds closely with the rise in the line representing sickness from pneumonia in Diagram 1, page 441; it corresponds with the rise in the line representing sickness from bronchitis on the same page, also with the line representing influenza, in Diagram 2, on a following page.

[Continued on page 442.

EXHIBIT 26.—*Per Cent of Weekly Reports Stating Presence of each of Diseases Represented, for the Years 1877, 1878, and 1879, and for each Month of the Year 1879; also Average Per Cent for Diseases Reported Present,—Compiled from Weekly Reports by Health Officers of Cities and Regular Correspondents of the State Board of Health.**

ORDER IN 1879.†	DISEASES.	YEAR.			MONTHS, 1879.											
		1877.	1878.	1879.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
	AV. FOR TABULATED DISEASES REPORTED PRESENT	‡28	‡30	33	35	36	36	35	30	30	32	37	35	34	34	34
3	Bronchitis	55	64	64	83	87	83	78	65	54	40	41	50	59	65	77
--	Cerebro-spi. Meningitis	3	2	2	3	4	6	4	0.4	1	2	3	1	3	0	1
--	Cholera Infantum	11	11	14	2	2	4	2	0.4	5	35	57	31	8	4	1
--	Cholera Morbus	15	14	19	3	4	4	5	8	15	50	67	38	15	4	4
6	Consumption, Pulm'ry	52	71	70	71	71	69	77	74	73	69	67	67	69	67	64
--	Croup, Membraneous	6	7	7	16	10	9	10	5	2	0.3	1	3	3	7	14
11	Diphtheria	19	23	29	39	36	26	22	20	20	18	24	23	34	44	42
8	Diarrhea	41	41	48	20	21	25	30	31	44	77	93	83	58	40	30
--	Dysentery	21	19	18	5	5	6	8	6	8	28	58	40	20	14	9
--	Erysipelas	20	21	25	31	28	33	31	33	29	27	21	17	16	19	19
1	Fever, Intermittent	75	82	82	63	69	73	81	89	90	93	92	93	88	78	66
5	Fever, Remittent	52	58	57	33	38	40	51	57	63	70	78	67	65	52	49
--	Fever, Typhoid (Ent.)	14	10	12	6	5	6	8	3	4	5	14	20	24	25	17
14	Fever, Typho-malarial	26	24	22	16	14	13	9	9	13	16	31	42	40	32	20
4	Influenza	41	44	45	70	81	76	66	41	29	23	23	33	30	38	51
--	Measles	7	5	12	9	8	8	13	22	23	16	7	9	8	10	13
7	Neuralgia	-----	‡10	59	49	59	68	65	55	59	52	52	56	62	66	66
10	Pneumonia	40	41	41	69	80	74	62	40	26	19	15	23	22	39	51
--	Puerperal Fever	4	3	3	5	4	6	3	2	2	3	1	4	5	4	2
2	Rheumatism	60	68	72	80	78	79	81	75	71	65	57	66	70	75	74
12	Scarlatina	21	25	23	35	29	36	31	25	17	17	13	14	22	24	23
--	Small-pox	4	0.2	0.4	0	0	0	0	0.4	2	1	0	0	0	0.4	1
9	Tonsilitis	-----	‡11	45	54	60	60	52	44	43	28	28	32	43	52	60
13	Whooping-cough	21	21	23	30	28	23	19	16	20	21	20	26	21	25	28

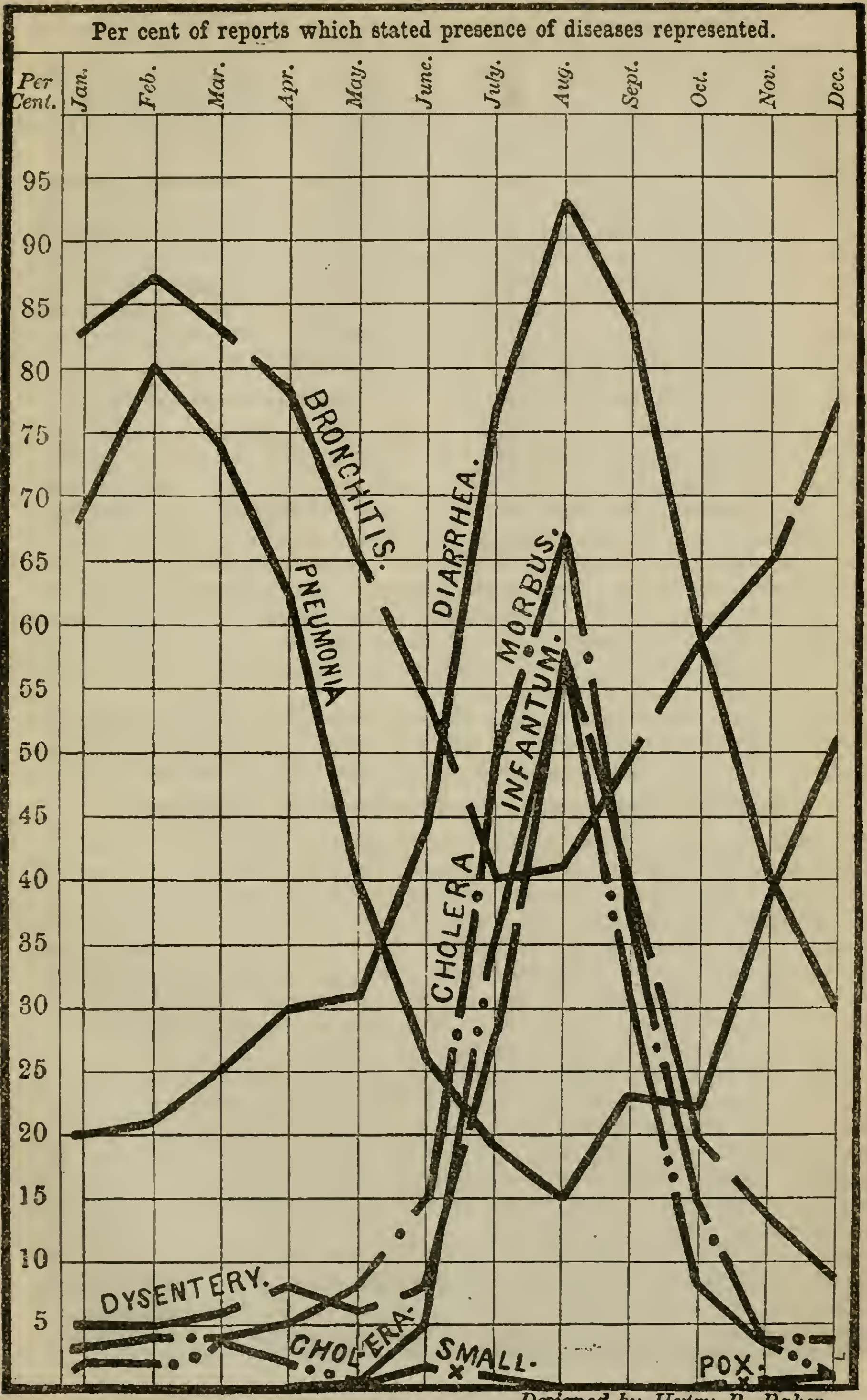
* For 1877, from 3,320 weekly reports by 115 health officers and correspondents; for 1878, from 3,221 weekly reports by 97 health officers and correspondents; for 1879, from 3,755 weekly reports by 110 health officers and correspondents.

† Judging from the per cent of reports, in connection with the order of prevalence.

‡ Neuralgia and tonsilitis are not included in the average for 1877 and 1878, because these diseases were not printed on any of the postal blanks used before Oct. 1, 1878, and not on all used after that time; and it is probable that the reports concerning these two diseases were not regularly made throughout the year and that they were not at any time so complete as those concerning the other diseases tabulated. For 1878, including neuralgia and tonsilitis, the average per cent of reports stating presence of diseases tabulated was 28.

[Graphic representations of statements in Exhibit 26 are given in Diagram 1, on the page opposite this, and in Diagrams 2, 3, and 4, on pages following. These diagrams, representing the sickness from the several diseases, may be compared directly with diagrams in the preceding article, representing the meteorological conditions at the same time.]

DIAGRAM 1—WEEKLY REPORTS OF DISEASES IN MICHIGAN, IN 1879.



Designed by Henry B. Baker.

The influences connected with the high temperature in October, 1879, shown in Diagram I., page 316, seem to have been most marked in relation to pneumonia, influenza, and diarrhea. The usual increase of pneumonia and influenza, and the usual decrease of diarrhea,* seem to have been checked thereby. The warm weather continued through the greater part of the month of October. The absolute humidity of the air was also great.

There are, however, closer correspondencies between sickness and meteorological conditions other than temperature considering every month in the year. As an instance, the reader is respectfully asked to notice in Diagram VIII., page 348, the very close correspondence between the line of × × × ×'s, representing the average ozone by night observations, for several stations in Michigan, and the line representing sickness from pneumonia (inflammation of the lungs), in Diagram 1, page 441. It will be seen that, month by month, the course of one of the lines is almost exactly the same as of the other.

EXHIBITS OF DISEASES AND COINCIDENT METEOROLOGICAL CONDITIONS.

In this Report, as heretofore, quite a number of diseases which cause sickness in this State are very thoroughly studied in a way to learn what meteorological conditions prevail when there is more than the usual sickness from each given disease, and what conditions prevail when there is less than usual sickness from the same diseases; thus giving information essential for a systematic study of the causes of the diseases themselves, or of the conditions favoring their occurrence. On pages following, these diseases are studied in the following order: bronchitis, pneumonia, membraneous croup, diphtheria, tonsilitis, influenza, rheumatism, neuralgia, consumption of the lungs, in one group, as winter diseases; and diarrhea, cholera infantum, and intermittent fever, in another group, as summer diseases.

The manner of making and using the exhibits which the writer employs in this study, is explained in connection with the study of bronchitis, under the sub-head, "How to study relations of climatic conditions to sickness," p. 444.

RELATIONS OF BRONCHITIS TO METEOROLOGICAL CONDITIONS.

PROPOSITION 1.—That **more** than the average per cent of weekly reports stated the presence of Bronchitis in months when the Average Daily range of Temperature, the Relative Humidity of the Atmosphere, the Ozone, the Average Velocity of the Wind, the Monthly and the Average Daily Range of the Barometer, and the Average Daily Pressure of the Atmosphere were **greater** than the average for the year; and **less** than the average per cent of reports stated the presence of Bronchitis in the months when these conditions were **less** than the average for the year. In Exhibit 27, page 443, the letter *a* marks exceptions to this proposition for the year 1879.

PROPOSITION 2.—That **more** than the average per cent of weekly reports stated the presence of Bronchitis in months when the Average Daily Temperature, and the Absolute Humidity of the Atmosphere, were **less** than the average for the year; and **less** than the average per cent of reports stated the presence of Bronchitis in months when these conditions were greater than the average for the year. In Exhibit 27, page 443, the letter *b* marks exceptions to this proposition for the year 1879.

In dealing with this subject in the Vital Statistics of Michigan, the writer has been accustomed to assume, for the purposes of study, that the air exhaled

[Continued on page 444]

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* Which decrease in 1878 was from 81 per cent of reports in September to 47 per cent in October, while in 1879 it is from 83 per cent of reports in September to 58 per cent in October.

EXHIBIT 27.—BRONCHITIS.—*Per Cent of Weekly Reports of Diseases in Michigan, Stating Presence of Bronchitis during the Year and during each Month of the Year 1879, Compared with some given Meteorological Conditions at the same time, as observed at the Office of the State Board of Health, Lansing, Michigan, which is near the center of the thickly-settled part of the State.**

MONTHS IN ORDER OF PER CENT OF WEEKLY REPORTS STATING PRESENCE OF BRONCHITIS.†		Per Cent of Weekly Reports Stating Presence of Bronchitis.†	Av. Order of Prevalence where Present. †, ‡	TEMPERATURE Degrees Fahr.			HUMIDITY OF ATMOSPHERE. Av. of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily.		VAPOR INHALED AND EXHALED.		OZONE.—RELATIVE.		Av. Velocity of the Wind, Miles per Hour.—By Robinson's Registering Anemometer. ††	PRESSURE OF ATMOSPHERE. Inches of Mercury. (Reduced to 32° F.)		
				AV. RANGE.							Scale of 10 degrees of Coloration.			RANGE OF BAROMETER.		
				Of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily.	During Day and Following Night, by Registering Thermometers,—Obs'v'd at 7 A. M.	Average of Daily Observations at 7 A. M., 2 P. M., and 9 P. M.	Relative Humidity, or Per Cent of Saturation.	Absolute Humidity—Grs. of Vapor in a Cubic ft. of Air.§	Ounces (Troy) of Vapor Inhaled by one Person in 24 hours.‖	Ounces (Troy) of Vapor Exhaled from Air Passages in 24 Hours, in Excess of Vapor Inhaled.¶	Day Observation,—7 A. M. to 2 P. M.	Night Observation,—9 P. M. to 7 A. M.		Monthly, and for Year.	Av. Daily Range of Observations at 7 A. M., 2 P. M., and 9 P. M.	Average Pressure.
YEAR 1879..		64	3.6	------	**115	49.14	70	3.41	2.15	9.53	3.15	3.58	‡‡ 9.7	1.114	.132	29.045
More than the Av. Per Cent of Bronchitis.	Feb...	87	2.4	*a* 9.96	*a*17.64	22.49	85	1.40	0.88	10 80	3.41	4.77	------	.915	.147	29 045
	Mar...	83	2.5	*a*11.04	*a*18.10	36.27	72	2.07	1.29	10.39	3 79	4.50	12.4	*a* .820	.152	*a*29.015
	Jan...	83	2.6	*a*10.84	*a*18.04	25.03	80	1.48	0.93	10.75	3.36	3.87	------	*a* .861	.181	29.057
	April.	78	2.8	16.27	24.22	47.54	*a* 60	2.75	1.72	9.96	*a* 2.62	*a* 2.80	*a* 9.6	.952	*a* .104	*a*29.004
	Dec. ..	77	3.4	*a* 8.39	*a*15.03	27.46	80	1.65	1.03	10 65	*a* 2.97	3.87	11.3	.983	.207	*a*29.034
	Nov...	65	3.6	*a*11.23	*a*16.77	38.22	75	2.45	1.53	10.15	3.53	4.63	12 2	1.078	.199	*a*29.029
	May..	65	3.6	16 81	27.96	*b* 60.88	*a* 59	*b* 4.19	2.62	9.06	*a* 2.69	*a* 2.80	*a* 7.4	*a* .798	*a* .109	29.085
Average...		64	3.6	13.61	20.83	49.14	70	3.41	2.15	9.53	3.15	3.58	‡‡ 9.7	.872	.132	29.045
Less than the Av. Per Cent.	Oct...	59	4.0	*a*14.00	20.16	59.50	68	4.58	2.86	8.82	2.73	3.52	*a* 10.2	*a*1.200	.124	*a*29.115
	June..	54	3.9	*a*15.10	*a*21.87	67.71	66	5.18	3.24	8.44	1.97	2.60	6.8	*a* .914	.111	29.016
	Sept...	50	4.4	*a*15.80	*a*22.27	58.11	70	4.19	2.62	9.06	*a* 3.17	3.50	*a* 10.0	.858	.097	*a*29.106
	Aug...	41	5.4	*a*17.90	*a*24.97	70.65	62	5.26	3.29	8.39	*a* 3.74	2.48	8.4	.454	.067	22.030
	July..	40	5.0	*a*16.00	*a*22.87	75 86	61	6.10	3.81	7.87	*a* 3.81	3.56	8.6	.634	.089	28.998

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* Additional statements relative to meteorological conditions may be found in an article on the Principal Meteorological Conditions in Michigan in 1879, on pages 303-363 of this Report. Statements relative to the soil-moisture and ground water, by months in 1879, are given in Exhibits 5 and 6, and and in summary foot-notes on pages 239-241.

† Explanations of statements in these columns, and other statements relative to the prevalence, in 1879, of the disease under consideration, may be found in Tables 2, 3, and 4, pages 374-438 of this Report, and also in Diagrams 1, 2, 3, and 4, page 441 and following pages.

‡ Small numbers in this column indicate great prevalence in the localities where the disease occurred, as compared with other diseases; and large numbers, a less prevalence.

§ Calculated from readings of dry-bulb and wet-bulb thermometers.

‖ Calculated for 18 respirations per minute, of 20 cubic inches of air each.

¶ Assuming the air exhaled to be saturated with vapor at the temperature of 98° F., in which case each cubic foot of air contains 18.69 grains of vapor, and 18 respirations per minute, of 20 cubic inches of air each, make 11.68 Troy ounces of vapor exhaled daily. No correction has been made for expansion of the air after it is inhaled.

** Not an average, but the extreme range for the year.

†† In March, 1879, the anemometer was moved from the roof of the old "State Offices" to the roof of the new Capitol, a much higher position; and the average velocity of the wind as recorded by the anemometer was much higher for 1879 than for 1878, perhaps partly for above reason.

‡‡ Average for the 10 months, March to December, 1879, inclusive.

[a] An exception to the proposition that **more** than the average per cent of weekly reports stated presence of bronchitis in months when the meteorological condition named at the head of the column was **greater** than the average for the year; and **less** in months when the same condition was **less** than the average.

[b] An exception to the proposition that **more** than the average per cent of weekly reports stated presence of bronchitis in months when the meteorological condition named at the head of the column was **less** than the average for the year; and **less** in months when the same condition was **greater** than the average for the year.

from the human lungs is very near the temperature of the body and is saturated at that temperature with moisture. If saturated with vapor of water at the temperature of 98° F., each cubic foot of air will contain 18.69 grains of water.

So far as proposition 2 holds true in regard to the humidity of the atmosphere, it follows that the quantity of vapor inhaled daily was **less** than the average in months when **more** than the average per cent of reports stated presence of bronchitis; also, according to the foregoing reasoning, the quantity of vapor exhaled daily in excess of that inhaled was **greater** than the average in months when **more** than the average per cent of reports stated presence of bronchitis; while **more** vapor was inhaled and a **less** excess exhaled daily in months when **less** than the average per cent of reports stated presence of bronchitis.

The same remarks may be made of the relations of the average amount of vapor of water inhaled and exhaled and the greater or less prevalence of pneumonia, membraneous croup, diphtheria, tonsilitis, influenza, rheumatism, neuralgia, and pulmonary consumption, discussed in Exhibits 28–35, page 447 and following pages.

HOW TO STUDY RELATIONS OF CLIMATIC CONDITIONS TO SICKNESS.

Bronchitis being the first disease in order in this systematic study, it may be well in connection with that disease to indicate how, by means of the form of exhibit devised and employed by the writer, the study may be profitably commenced. In these exhibits, in order not to have to repeat the facts respecting a disease in connection with each meteorological condition, and in order to study the combined influences of all important conditions upon each disease, the statements of the comparative prevalence of sickness from a disease in the several months of the year are placed at the left of the table, the months being arranged in order so that the month in which most sickness occurred is first, the other months following in the order of greatest sickness from the given disease, until the average is reached, when the average is stated, and the months continued in the same order. It is plain then that in all the months placed above the average line in the exhibit, there was more than the average sickness from the disease studied, and in all months below the average line there was less than the average sickness. It is evident that if an excess of heat, of ozone, of humidity, or other meteorological condition, is uniformly coincident with a greater than average sickness from the given disease, the figures in the column representing such condition will necessarily be found in the same order as are the figures showing the relative sickness—namely, those showing greatest excess first, and so on down to the average, below which the same order will occur, if the relation of the sickness to the meteorological condition is exactly quantitative. If excess of ozone, of humidity, or of temperature, is coincident with less than average sickness from the given disease, it is plain that the order of arrangement of the figures representing such conditions will necessarily be the reverse of that of the figures stating the sickness.

From the foregoing it would appear to be a very simple undertaking to ascertain just what conditions favor the occurrence of each disease. Within certain limits the results seem to warrant the belief that the subject is simple, —it seems plain, for instance, that the occurrence of diseases of the air-passages is favored by a cold dry air containing an excess of ozone, and that diseases of the bowels occur under influences connected with warm moist air lacking ozone; but that the subject is not so simple as it at first appears may be made evident by careful study of Exhibit 27, relative to Bronchitis. In that exhibit the months which are exceptional to the propositions printed on page

442 are marked by a letter *a* in the column where the exception occurs. In the third and fourth figure-columns of that exhibit, it may be seen that the proposition made with reference to the average daily range of temperature held true in only three cases out of the twelve months studied.

If, without further examination, we stop here, we must conclude that extreme average daily range of temperature is not conducive to the occurrence of bronchitis. If the reader were to stop at this point, he might wonder why the proposition is not reversed, so that there would not be more exceptions than instances of fulfillment of the proposition. In this particular instance, the proposition reads as it does because it has come to be a general belief among practicing physicians that sudden changes in the air to a lower temperature do tend to cause bronchitis, and because a thorough study of these statistics of sickness tends to strengthen that belief, as may appear as follows:—It may be seen from this exhibit for the year 1879, and has been found true in previous years, that bronchitis prevails most when the air is cold, dry, contains an excess of ozone, and there is much wind; and yet the months of April and May, 1879, were exceptions in every one of the columns representing the the above-mentioned conditions,—as regards temperature, humidity, and night ozone, these two months were the only exceptions; and by the columns relative to average daily range of temperature, it may be seen that these two months (April and May) were almost the only ones in which the proposition on the subject of coincidence of excessive range of temperature and more than the average sickness from bronchitis held true, there having been an excessive average daily range of temperature in both those months. Joining the evidence from the several sources mentioned, it appears that there was more sickness from bronchitis in April and May than the average of all months in the year; that according to Exhibit 27 it could not have been due to continuous low temperature, excess of wind, or of ozone; that the average daily range of temperature was excessive; that it is a belief of physicians that this favors the occurrence of bronchitis; and it is reasonable to suppose that the the excessive range of temperature was a chief meteorological factor in the causation of bronchitis in April and May, 1879, and that in this we find the explanation of the exceptions marked for those months in many of the other columns of Exhibit 27, page 443.

The evidence seems to be that in Michigan daily range of temperature is not usually a controlling condition in the causation of bronchitis, and yet that it sometimes is so in months when conditions which seem usually to be controlling are near their average for the year, perhaps because, as an extreme range of temperature under those circumstances implies, notwithstanding the average temperature was normal, there was at some time during the month unusually low temperature, low temperature being apparently one of the controlling conditions.

It is hoped that enough has been said to illustrate some methods of study by means of these exhibits, and that many persons may find the subject of such interest that they will avail themselves of the data presented in this form and utilize it in studies on the causation of diseases, and of sickness from specific diseases.

RELATIONS OF PNEUMONIA TO METEOROLOGICAL CONDITIONS.

PROPOSITION 1. That more than the average per cent of weekly reports stated the presence of pneumonia in months when the average daily range of temperature, the relative humidity of the atmosphere, the ozone, the average velocity of the wind, the monthly and the average daily range of the barometer, and the average daily pressure of the atmosphere were **greater** than the average for the year; and **less** than the average per cent of the reports stated the presence of pneumonia in months when these conditions were **less** than the average for the year. In Exhibit 28, page 447, the letter *a* marks exceptions to this proposition for the year 1879.

PROPOSITION 2. That **more** than the average per cent of weekly reports stated the presence of pneumonia in months when the average daily temperature and the absolute humidity of the atmosphere were **less** than the average for the year; and **less** than the average per cent of reports stated the presence of pneumonia in months when these conditions were **greater** than the average for the year. In Exhibit 28, page 447, the letter *b* marks exceptions to this proposition for the year 1879.

It is worthy of notice that the single exception, in November, to the proposition relative to average temperature, seems to be explained by the much less than average *range* of temperature in that month ; also that the two exceptions, in November and in April, to the proposition relative to night ozone seem to be similarly explained by the fact of the less than the average range of temperature in November and the greater than average range of temperature in April. This Exhibit also supplies other very interesting evidence, particularly respecting the influence of humidity in the causation of pneumonia; a careful study of which seems to show that the proposition concerning relative humidity should be reversed in order to accord with the actual influence of relative humidity, it being difficult to avoid the conclusion that, in connection with the even temperature, the comparative saturation of the air with moisture in November prevented the sickness from pneumonia being as prevalent as it otherwise would have been because of the excessive wind and ozone, the less than average "Absolute" humidity, and the lower than average temperature; also that in connection with the excessive range of temperature just mentioned as having increased the pneumonia in April, the "Relative" dryness of the air in April was an important factor in causing pneumonia in that month notwithstanding the less than average wind and ozone.

In the year 1870, Dr. S. S. Cutter of Coldwater, Michigan, expressed his conviction that the excess of pneumonia in Winter is due to carbonic acid and other impurities in the air of rooms not as well ventilated in Winter as in Summer.

A. N. Bell, M. D., editor of the Sanitarian, New York, in a paper before the American Public Health Association, at its New Orleans meeting, has suggested as a reason why pneumonia prevails most when the air is cold and dry, that the disease is caused by foul air, which he maintains is drawn up from cellars and foul surrounding earth into the closed house in cold weather.

The foregoing suggestions are worthy of thought, but the author of this article has many times suggested that pneumonia is in some way causally related to dryness as well as to coldness of the air, and that its relation to night ozone is much closer than to any other known condition, though its relations to wind are also close. The great amount of evidence on this subject which he has collected and published in the Vital Statistics of Michigan, and in the Annual Reports of the State Board of Health, would seem to be incompatible with a belief in the causation of pneumonia by cellar air or by foul air due to defective ventilation, for it is difficult to see how the disease can be thus caused and yet prevail most when the wind is highest, and when the night ozone is excessive, conditions which may be supposed to make the ventilation of dwellings more complete than it is during the periods of calm, cold weather.

EXHIBIT 28.—PNEUMONIA.—*Per Cent of Weekly Reports of Diseases in Michigan, Stating Presence of Pneumonia, during the Year and during each Month of the Year 1879, Compared with given Meteorological Conditions at the same time, as observed at the Office of the State Board of Health, Lansing, Mich., which is near the center of the thickly settled part of the State.**

	Months in Order of Per Cent of Weekly Reports Stating Presence of Pneumonia.†	Per Cent of Weekly Reports Stating Presence of Pneumonia.†	Average Order of Prevalence where Present.†‡	Temperature, Degrees Fahr.			Humidity of Atmosphere. Av. of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily.		Vapor Inhaled and Exhaled.		Ozone,—Relative. Scale of 10 Degrees of Coloration.		Average Velocity of Wind, Miles per Hour,—By Registering Anemometer.††	Pressure of Atmosphere. Inches of Mercury. (Reduced to 32° F.)		
				Range, Av. Daily, and for Year.		Average of Daily Observations at 7 A. M., 2 P. M., and 9 P. M.	Relative Humidity, or Per Cent of Saturation.	Absolute Humidity—Grains of Vapor in a Cubic Foot of Air.§	Ounces (Troy) of Vapor Inhaled by one Person in 24 Hours.‖	Ounces (Troy) of Vapor Exhaled from Air Passages in 24 Hours, in Excess of Vapor Inhaled.¶	Day Observation,—7 A. M. to 2 P. M.	Night Observations,—9 P. M. to 7 A. M.		Range of Barometer.		Average Pressure.
				Of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily.	During Day and following Night, by Registering Thermometers, Observed at 7 A. M.									Monthly, and for Year.	Average Daily Range of Observations at 7 A. M., 2 P. M., and 9 P. M.	
	Year 1879	41	5.2	......	** 115	49.14	70	3.44	2.15	9.53	3.15	3.58	‡‡9.7	1.114	.132	29.045
More than the Av. of Pneumonia.	Feb.	80	4.3	*a* 9.96	*a*17.64	22.49	85	1.40	0.88	10.80	3.41	4.77	......	.915	.147	29.045
	Mar.	74	4.4	*a*11 04	*a*18.10	36.27	72	2.07	1.29	10.39	3.79	4.50	12.4	*a* .820	.152	*a* 29.015
	Jan.	69	4.7	*a*10.84	*a*18.04	25.03	80	1.48	0.93	10.75	3.36	3.87	......	*a* .861	.181	29.057
	April	62	4.5	16.27	24.22	47 54	*a* 60	2.75	1.72	9.96	*a* 2.62	*a* 2.80	*a* 9.6	.952	*a* .104	*a* 29.004
	Dec.	51	4.9	*a* 8.39	*a*15.03	27.46	80	1.65	1.03	10.65	*a* 2.97	3.87	11.3	.983	.207	*a* 29.034
	Average	41	5.2	13.61	20.83	49.14	70	3.44	2.15	9.53	3.15	3.58	‡‡9.7	.872	.132	29.045
Less than the Average of Pneumonia.	May.	40	5.4	*a*16 81	*a*27.96	60.88	59	4.19	2.62	9.06	2.69	2.80	7.4	.798	.109	*a* 29.085
	Nov.	39	5.2	11.23	16.77	*b*38.22	*a* 75	*b* 2.45	1.53	10.15	*a* 3.53	*a* 4.63	*a* 12.2	*a*1.078	*a* .199	29.029
	June	26	6.1	*a*15.10	*a*21.87	67.71	66	5.18	3.24	8 44	1.97	2.60	6.8	*a* .914	.111	29.016
	Sept.	23	6.3	*a*15.80	*a*22.27	58.11	70	4.19	2.62	9.06	*a* 3.17	3.50	*a* 10.0	.858	.097	*a* 29.106
	Oct.	22	6.3	*a*14.00	20.16	59.50	68	4.58	2.86	8 82	2.73	3.52	*a* 10.2	*a*1.200	.124	*a* 29.115
	July.	19	6.3	*a*16.00	*a*22.87	75.86	61	6.10	3.81	7.87	3.81	3.56	8.6	.634	.089	28.998
	Aug.	15	8.1	*a*17.90	*a*24.97	70.65	62	5.26	3.29	8.39	3.74	2.48	8.4	.454	.067	29.030

*, †, ‡, §, ‖, ¶, **, ††, ‡‡. See foot-notes with these marks, in Exhibit 27, page 443.

a Exceptions to proposition 1, page 445-6.

b Exceptions to proposition 2, page 446.

More nearly in accord with the view of the writer, and with conclusions derived from systematic study of the evidence collected in this State during the past ten years, is a view reported to have been expressed by Prof. H. C. Wood, M. D., at a meeting of the Philadelphia County Medical Society, to the effect that "in the early stage of sthenic pneumonia blood is drawn to the lungs because there is a local vaso-motor palsy." The tone or contractility of the blood-vessels in other parts of the body being then fully as great as at other seasons of the year, the comparative paralysis of the blood-vessels in the lungs may easily be supposed to be produced by exposure to wind in a cold dry air containing an excess of ozone. We have only to remember the appearance of the face of a person who has come into a warm room from such an exposure, to realize that paralysis of the superficial blood-vessels of the face has been thus caused.

It is conceivable, however, that all of the foregoing suggestions of the causation of pneumonia may be correct, and that the local paralysis of blood-vessels, and stagnation of blood, with exudation in the lungs, may only occur from exposure to wind in cold dry air, etc., after subsequent exposure in a close and imperfectly ventilated room. The fact which is most difficult to harmonize with the hypothesis that ordinary foul air is a factor in the causation of pneumonia, is the extremely close relation which seems to exist between pneumonia and the ozone in the night air. This relation is referred to on page 442, under the heading "Diagrams of Sickness in 1879;" and it is interesting to study the close correspondence in the lines graphically representing the night ozone in each year, with lines representing sickness or deaths from pneumonia in the same year. In the Vital Statistics of Michigan, 1873, the writer has suggested the importance of this evidence, because of the fact that fibrin in the blood, as well as in the exudate in the lungs, is such an important part of the disease pneumonia, and because of the possibility of explaining the presence of fibrin in excess by supposing it to be formed from the albumen in the blood, by the action of ozone, which the writer has shown is in excess whenever sickness from pneumonia is excessive, according to the evidence for several years in Michigan.

PNEUMONIA AT SALINE,—PNEUMONIA AND OZONE, ETC.

The State Board of Health desires to place on record the results of original observations by physicians in practice, and by others, of circumstances attending or preceding outbreaks of sickness, and of other facts which may help to determine or explain the causation of sickness. The following report of prevlence of pneumonia, and inquiries relative to its causation, were received in June, 1880, from the health office of Saline township, Washtenaw Co.:

> In this section we have had an unusual amount of pneumonia during the past two or three months; and Doctor Breakey, of Ann Arbor, informs me that the same disease has been very prevalent in Ann Arbor and vicinity during the past Winter and Spring.
>
> While pneumonia is not (strictly speaking) a preventable disease, still it seems to me that there must be some fact in the meteorological conditions of the State which has some connection with the unusual prevalence of this disease, and which would have some *theoretical*, at least, interest to physicians who are studying the cause of disease; and thereby it might be a subject worthy of the attention of the State Board of Health. * * *
>
> If the Board has made any discoveries, or learned any new facts in relation to this matter (or should do so), either of interest or profit, I should be pleased to learn them.
>
> I remain, very respectfully,
>
> D. P. McLACHLAN, M. D.,
>
> *Saline, Washtenaw Co., Mich., May 31, 1880.* *Health Officer of Saline Township.*

In reply to this communication, there was sent to Dr. McLachlan a copy of Exhibit 12, notes, and comments, relative to pneumonia and coincident meteorological conditions in 1877, printed on pages 304–5 of the Report of the State Board of Health for 1878 (a copy of which Report had been sent to him, in Oct., 1879). The exhibit is similar to Exhibit 28, on page 447 of this Report, relative to pneumonia and coincident meteorological conditions in 1879. With it was sent a request that Dr. McLachlan contribute his own observations relative to the subject. The following reply was received:

> Not having any figures at hand I can, of course, not state positively, but it seems to me that we have had no excessive amount of dry cold weather during the past Winter and Spring to account for the unusual amount of pneumonia we have had here and in Ann Arbor. On the contrary, it has seemed

to me that the past Winter and Spring has been rather more than usually wet, and certainly the Winter was not severely cold, not at all to be compared with the Winter of 1874-5, when, in the city of Ann Arbor, for forty consecutive days the thermometer never rose to zero; and Dr. Breakey assures me that pneumonia has not been so prevalent in Ann Arbor for the past 14 years as during the past Winter.

Perhaps in the range of barometrical readings, and the amount of ozone in the atmosphere, some cause for the prevalence of pneumonia may be found, but I think dry and cold air should be left almost entirely out of the calculation. I have long entertained the idea that diseases of the respiratory passages were affected more by the amount of ozone in the air than by changes noted by the thermometer. Perhaps, also, the range of the barometer may affect them some, but my faith still clings to ozone as the principal cause of disease of the respiratory passages.

With great respect I remain very sincerely,

Saline, Washtenaw Co., Mich., June 4, 1880. DR. D. P. MCLACHLAN.

Exhibit 28, page 447, shows that for the year 1879, as has been shown in similar exhibits for previous years, pneumonia was very closely related to cold dry air.

By a study of Table IV., page 326, of Exhibit 16, page 325, and of similar tables and exhibits in the Reports for 1878 and 1879, it may be seen that in all the winter months the average quantity of vapor of water in the air is small as compared with that in the summer months, or even with the average for the year. It should be remembered that cold air is saturated with a small quantity of vapor of water, while warm air may contain a much larger quantity of vapor and yet not be saturated; and that thus the air to some tests may *seem* the driest—for example may most readily and quickly dry out water from wet clothes, etc., hung in the air; or may *feel* dry to the face and hands—and yet may in reality contain the more water, or be the more moist. It is only by actual observation with some kind of a hygrometer that the absolute or the relative moisture of the air can be determined. Comparing Table IV., page 326, with Table V., page 331, it may be seen that when the relative humidity of the air is great (that is the air is, relatively to its capacity to contain moisture, moist), its absolute humidity (that is the actual quantity of vapor it contains) is, because of its low temperature, small.

If, as is believed, the air is exhaled from the lungs at nearly a uniform temperature throughout the year, and is saturated or nearly saturated with vapor of water, the cold air of winter must because of the small quantity of vapor which it contains take from the lungs and air-passages a much greater quantity of vapor than does the warm moist air of summer; and thus its drying and irritating effect must be much greater.

Exhibit 28, page 447, indicates a close relation of pneumonia with variations in atmospheric pressure; the relation with ozone is also close. In order to add to the evidence of the dependence of pneumonia on abundant ozone, Dr. McLachlan was asked to cite his evidence of the causal relation between ozone and pneumonia, to name other observers of ozone than those for the State Board of Health, and to give definite dates of the prevalence of pneumonia at Saline and Ann Arbor. His reply follows herewith:

I have no other evidence relative to ozone than your Reports. I have formed my opinion relative to the influence of ozone on diseases of the air-passages as we sometimes form a diagnosis of some obscure disease peculiar to females (*by exclusion*). I have seen and treated pneumonia at all seasons of the year, and in all kinds of weather, and I think that the most severe case of pneumonia I ever treated was in the month of June when the weather was warm and pleasant. I have also noticed that we have attacks of coryza amounting almost to an epidemic (nearly everybody snuffing and sneezing) without being able to discover any change in the weather sufficient to account for it; and I have come to the conclusion that there was or must be something in the composition of the air itself that produced these diseases; and not knowing what else it could be I have judged it might be ozone. I have not the means (and if I had I am not sure that I possess the necessary skill) to verify or disprove my theory. I have, therefore, given it to you (with my opinion) for what it is worth, and if it should be proven to be untrue no one will be more pleased than I to know of such proof.

I think I said in my last that perhaps the range of barometrical readings might have their influence, and I have no desire at present to modify that statement.

I know of no one who is taking any ozone observations at all.

I cannot give you any dates relative to Ann Arbor, but the first case in this vicinity of which I have any knowledge, was first seen by one of our physicians on February 7; the second, on February 20; the third, on April 7, since when we have not been free from pneumonia until within the last week. The last case was first seen May 24, and discharged convalescent June 3. I do not know whether we have had our last case for the present, but presume we have.

Prior to the case seen February 7, there has not been, to my knowledge, a case in this vicinity for months, except one last August, supervening typhoid fever, and *that* was fatal. We have had more pneumonia in this vicinity during the six months last past than in the preceding two years, and Dr. Breakey informs me that they in Ann Arbor have not had such a visitation in sixteen years as during the past winter and spring. Dr. Kapp, of Ann Arbor, informed me about a month ago that he was at that time treating *eight* cases of Pneumonia.

I remain very respectfully, D. P. McLACHLAN.

Saline, Washtenaw Co., Mich., June 7, 1880.

Taking the reports of pneumonia in the State as a whole, and the meteorological conditions existing at the same time at a station in about the center of the most thickly inhabited portion of the State, Exhibit 28, page 447, shows what relations sickness from pneumonia bore to the temperature, humidity, ozone, etc., in the year 1879.

PNEUMONIA AND DIPHTHERIA AT MILFORD, OAKLAND CO., MICH.

Pneumonia and diphtheria were the prevailing diseases last winter and spring [1878-9.] There was one characteristic in regard to its prevalence which I observed, viz., that when we had a thaw, which was almost always accompanied with fog and more or less rain, we would have new cases of pneumonia occurring; and whenever a cold snap occurred it put a stop to it as long as said cold weather lasted, when it would again break out, being very fatal and unmanageable, and in most cases involving both lungs.

There has been scarcely none so far this winter. I have had only one case, and have heard of only one or two others.

The cases of diphtheria reported for last winter were mostly mild ones, the severe and fatal cases occurred earlier in the winter, during 1878, and were then reported. The one death reported by Dr. H., as occurring this winter, is in my mind more croupous than diphtheritic, but have reported it as such.

Yours truly,

Milford, Oakland Co., Mich., Feb. 11, 1880. DR. C. G. DAVIS, *Health Officer.*

Referring to the influence of fogs and of cold damp air on pneumonia, and other diseases of the lungs and of the air-passages, it has been suggested by a reader of the Annual Reports of the State Board of Health, that the lungs and air-passages may be greatly chilled by the abstraction of heat to convert into vapor the particles of *fog* and the *invisible* particles of *water* floating in the air, even when the amount of *vapor* contained in the air is small; and that in this fact may be an explanation of one of the much-dreaded effects of "night-air."

CONTAGIOUS PNEUMONIA (?) IN HAZLETON TOWNSHIP, SHIAWASSEE CO.--REPORTED BY THE HEALTH OFFICER.

The reason of my writing is to inform you of a disease which seems to show a degree of contagion. It seems to be confined mostly to a few sections of the middle interior portions of Hazelton and New Haven, the adjoining country being, as far as I can learn, comparatively free from anything of the kind. There have been four deaths very close together, which seemed to be of the character of typhoid pneumonia, others nervous pneumonia. There have been some Canada people moved in there this winter, and is a little low and marshy.

Respectfully yours,

Hazelton, Shiawassee Co., Mich., Feb. 25, 1880. DR. B. BARKER, *Health officer of Hazelton.*

RELATIONS OF MEMBRANEOUS CROUP TO METEOROLOGICAL CONDITIONS.

PROPOSITION 1. That more than the average per cent of weekly reports stated the presence of Membraneous Croup in months when the Average Daily Range of Temperature, the Relative Humidity of the Atmosphere, the Ozone, the Average Velocity of the Wind, the Monthly and the Average Daily Range of the Barometer, and the average Daily Pressure of the Atmosphere were greater than the average for the year; and less than the average per cent of reports stated the presence of Membraneous Croup in months when these conditions were less than the average for the year. In Exhibit 29, below, the letter *a* marks exceptions to this proposition for the year 1879.

EXHIBIT 29.—MEMBRANEOUS CROUP.—*Per Cent of Weekly Reports of Diseases in Michigan, Stating Presence of Membraneous Croup during the Year and during each Month of the Year 1879, Compared with some given Meteorological Conditions at the same time, as Observed at the Office of the State Board of Health, Lansing, Michigan, which is near the thickly-settled part of the State.* *

MONTHS IN ORDER OF PER CENT OF WEEKLY REPORTS STATING PRESENCE OF MEMBRANEOUS CROUP.†		Per Cent of Weekly Reports Stating Presence of Membraneous Croup.†	Average Order of Prevalence where Present.†,‡	TEMPERATURE. Degrees Fahr.			HUMIDITY OF ATMOSPHERE. Av. of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily.		VAPOR INHALED AND EXHALED.		OZONE,—RELATIVE. Scale of 10 Degrees of Coloration.		Average Velocity of Wind, Miles per Hour,—by Robinson's Registering Anemometer.††	PRESSURE OF ATMOSPHERE. Inches of Mercury. Corrected for Temperature.-Reduced to 32° F.		
				AV. RANGE.										RANGE OF BAROMETER.		
				Of Observations at 7 A. M., 2 P. M., and 9 P. M. Daily.	During Day and Following Night, by Registering Thermometers,—Obs'v'd at 7 A.M.	Average of Daily Observations at 7 A. M., 2 P. M., and 9 P. M.	Relative Humidity, or Per Cent of Saturation.	Absolute Humidity,—Grs. of Vapor in a Cubic ft. of Air.§	Ounces (Troy) of Vapor Inhaled by one Person in 24 Hours.‖	Ounces (Troy) of Vapor Exhaled from Air Passages in 24 Hours, in excess of Vapor Inhaled.¶	Day Observation,—7 A. M. to 2 P. M.	Night Observation,—9 P. M. to 7 A. M.		Monthly, and for Year.	Average Daily Range of Observations at 7 A. M., 2 P. M., and 9 P. M.	Average Pressure.
Year 1879...		7	6.6	......	**115	49.14	70	3.44	2.15	9.53	3.15	3.58	‡‡9.7	1.230	.132	29.015
More than Av. Per Cent of Memb. Croup.	Jan...	16	7.0	*a*10.84	*a*18.04	25.03	80	1.48	0.93	10.75	3.36	3.87	......	*a* .861	.181	29.057
	Dec...	14	6.9	*a* 8.39	*a*15.03	27.46	80	1.65	1.03	10.65	*a* 2.97	3.87	11.3	.983	.207	*a*29.034
	Feb...	10	7.3	*a* 9.96	*a*17.64	22.49	85	1.40	0 88	10.80	3.41	4.77	......	.915	.147	29.045
	April.	10	6.2	16.27	24.22	47.54	*a* 60	2.75	1.72	9.96	*a* 2.62	*a* 2.80	*a* 9.6	.952	*a* .104	*a*29.004
	Mar. .	9	7.1	*a*11.04	*a*18.10	36.27	72	2.07	1.29	10.39	3.79	4.50	12.4	*a* .820	.152	*a*29.015
	Nov. .	7	6.5	*a*11.23	*a*16.77	38.22	75	2.45	1.53	10.15	3.53	4.63	12.2	1.078	.199	*a*29.029
Average....		7	6.6	13.61	20.83	c49.14	70	c3.44	2.15	9.53	3.15	3.58	‡‡ 9.7	.872	.132	29.045
Less than Av. Per Cent of Memb. Croup.	May..	5	6.4	*a*16.81	*a*27.96	60.88	59	4.19	2.62	9.06	2.69	2.80	7.4	.798	.109	*a*29.085
	Oct...	3	6.6	*a*14.00	20.16	59.50	68	4.58	2.86	8.82	2.73	3.52	*a*10.2	*a*1.200	.124	*a*29.115
	Sept..	3	5.4	*a*15.80	*a*22.27	58.11	70	4.19	2.62	9.06	*a*3.17	3.50	*a*10.0	.858	.097	*a*29.106
	June..	2	5.4	*a*15.10	*a*21.87	67.71	66	5.18	3.24	8.44	1.97	2.60	6.8	*a*.914	.111	29.016
	Aug...	1	5.0	*a*17.90	*a*24.97	70.65	62	5.26	3.29	8.39	*a*3.74	2.48	8.4	.454	,067	29.030
	July..	0.3	4.0	*a*16.00	*a*22.87	75.86	61	6.10	3.81	7.87	*a*3.81	3.56	8.6	.634	.083	28.998

*, †, ‡, §, ‖, ¶, **, ††, ‡‡. See foot-notes with these marks, in Exhibit 27, page 443.

a Exceptions to proposition 1, above.

c There is no exception (for 1879) to proposition 2, page 452.

PROPOSITION 2. That **more** than the average per cent of weekly reports stated the presence of Membraneous Croup in months when the Average Daily Temperature and the Absolute Humidity of the Atmosphere were **less** than the average for the year, and **less** than the the average per cent of reports stated the presence of Membraneous Croup in months when these conditions were **greater** than the average for the year.

In Exhibit 29, page 451, it is shown that there is no exception to the above proposition for the year 1879.

In Diagram 2, page 456, the lowest line represents membraneous croup, and shows very well its prevalence compared with other diseases; but it is difficult to compare that line with the lines in diagrams representing temperature and other meteorological conditions, for the reason that the range of the sickness from croup is not made to cover as much space as is the range of temperature, etc. It is possible to see, however, from the line in Diagram 2, that croup nearly disappears from the reports in the warm, moist months.

RELATIONS OF DIPHTHERIA TO METEOROLOGICAL CONDITIONS.

PROPOSITION 1.—That **more** than the average per cent of weekly reports stated the presence of Diphtheria in months when the Average Daily Range of Temperature, the Relative Humidity of the Atmosphere, the Ozone, the Average Velocity of the Wind, the Monthly and the Average Daily Range of the Barometer, and the Average Daily Pressure of the Atmosphere were **greater** than the average for the year; and **less** than the average per cent of reports stated presence of Diphtheria in months when these conditions were **less** than the average for the year. In Exhibit 30, page 453, the letter *a* marks exceptions to this proposition for the year 1879.

PROPOSITION 2.—That **more** than the average per cent of weekly reports stated the presence of Diphtheria in months when the Average Daily Temperature and the Absolute Humidity of the Atmosphere were **less** than the average for the year; and **less** than the average per cent of reports stated the presence of Diphtheria in months when these conditions were **greater** than the average for the year. In Exhibit 30, page 453, the letter *b* marks exceptions to this proposition for the year 1879.

In Exhibit 24, page 436, the comparative importance of Diphtheria as a cause of sickness in Michigan in 1879, may be learned; and from Exhibit 26, page, 440, its course by months in that year may be traced. The line relative to Diphtheria in Exhibit 26 is graphically represented in Diagram 2, page 456.

Special reports of outbreaks of Diphtheria are printed in the first part of this Report—that part paged in Roman numerals.

HOW DIPHTHERIA MAY BE SPREAD.

If any one is perplexed to understand how it is that a contagious disease like diphtheria can be closely and causally related to meteorological conditions, it may be useful to consider that the same has been found true as regards small-pox, which also usually prevails more in cold than in warm seasons of the year, while it is well known that cholera and yellow fever prevail most in warm seasons. The probable reasons for the greater prevalence of diphtheria in cold seasons have been explained in previous Reports, but may be briefly suggested here. The ventilation of all places where children come together is much better in warm than in cold weather; the poison of the disease is therefore less likely in warm than in cold seasons to be met with and inhaled by children; children at the school ages come together in schools more in winter than in summer, and it is noticeable that diphtheria increases in prevalence soon after the general opening of schools in the autumn. Diphtheria is probably contracted most easily by children who have sore throats, and this seems to be a controlling reason why diphtheria spreads most at seasons of the year when tonsilitis, bronchitis, influenza, etc., prevail. Whether any or all of these last-named diseases are communicable remains to be ascertained.

EXHIBIT 30.—DIPHTHERIA.—*Per Cent of Weekly Reports of Diseases in Michigan, Stating Presence of Diphtheria during the Year and during each Month of the Year 1879, Compared with some given Meteorological Conditions at the same time, as observed and recorded at the Office of the State Board of Health, Lansing, Michigan, which is near the center of the thickly-settled part of the State.**

Months in Order of Per Cent of Weekly Reports Stating Presence of Diphtheria.†		Per Cent of Weekly Reports Stating Presence of Diphtheria.†	Average Order of Prevalence where Present.†, ‡	Temperature. Degrees Fahr.			Humidity of Atmosphere. Av. of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily.		Vapor Inhaled and Exhaled.		Ozone—Relative. Scale of 10 Degrees of Coloration.		Average Velocity of Wind, Miles per Hour,—By Registering Anemometer.††	Pressure of Atmosphere. Inches of Mercury. (Reduced to 32° F.)		
				Av. Range.										Range of Barometer.		
				Of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily.	During Day and following Night, by Registering Thermometers, —Observed at 7 A. M.	Average of Daily Observations at 7 A. M., 2 P. M., and 9 P. M.	Relative Humidity, or Per Cent of Saturation.	Absolute Humidity,—Grains of Vapor in a Cubic Foot of Air.§	Ounces (Troy) of Vapor Inhaled by one Person in 24 Hours.‖	Ounces (Troy) of Vapor Exhaled from Air Passages in 24 Hours, in Excess of Vapor Inhaled.¶	Day Observation,—7 A. M. to 9 P. M.	Night Observation,—9 P. M. to 7 A. M.		Monthly, and for Year.	Average Daily Range of Observations at 7 A. M., 2 P. M. and 9 P. M.	Average Pressure.
Year 1879..		29	5.4	......	** 115	49.14	70	3.44	2.15	9.53	3.15	3.58	‡‡ 9.7	1.114	.132	29.045
More than Av. Per Cent of Diphtheria.	Nov..	44	4.4	*a* 11.23	*a* 16.77	38.22	75	2.45	1.53	10.15	3.53	4.63	12.2	1.078	.199	*a* 29.029
	Dec..	42	5.2	*a* 8.39	*a* 15.03	27.46	80	1.65	1.03	10.65	*a* 2.97	3.87	11.3	.983	.207	*a* 29.034
	Jan...	39	5.3	*a* 10.84	*a* 18.04	25.03	80	1.48	0.93	10.75	3.36	3.87	......	.861	.181	29.057
	Feb..	36	6.1	*a* 9.96	*a* 17.64	22.49	85	1.40	0.88	10.80	3.41	4.77	......	.915	.147	29.045
	Oct..	34	5.0	14.00	*a* 20.16	*b* 59.50	*a* 68	*b* 4.58	2.86	8.82	*a* 2.73	*a* 3.52	10.2	1.200	*a* .124	29.115
Average...		29	5.4	13.61	20.83	49.14	70	3.44	2.15	9.53	3.15	3.58	9.7	.872	.132	29.045
Less than Average Per Cent of Diphtheria.	Mar..	26	6.4	11.04	18.10	*b* 36.27	*a* 72	*b* 2.07	1.29	10.39	*a* 3.79	*a* 4.50	*a* 12.4	.820	*a* .152	29 015
	Aug..	24	6.3	*a* 17.90	*a* 24.97	70.65	62	5.26	3.29	8.39	*a* 3.74	2.48	8.4	.454	.067	29.030
	Sept.	23	5.8	*a* 15.80	*a* 22.27	58.11	70	4.19	2.62	9.06	*a* 3.17	3.50	*a* 10.0	.858	.097	*a* 29.106
	April	22	6.1	*a* 16.27	*a* 24.22	*b* 47.54	60	*b* 2.75	1.72	9.96	2.62	2.80	9.6	*a* .952	.104	29.004
	May.	20	5.5	*a* 16.81	*a* 27.96	60.88	59	4.19	2.62	9.06	2.69	2.80	7.4	.798	.109	*a* 29.085
	June	20	4.4	*a* 15.10	*a* 21.87	67.71	66	5.18	3.24	8.44	1.97	2.60	6.8	*a* .914	.111	29.016
	July.	18	5.1	*a* 16.00	*a* 22.87	75.86	61	6.10	3.81	7.87	*a* 3.81	3.56	8.6	.634	.089	28.998

*, †, ‡, §, ‖, ¶, **, ††, ‡‡. See foot-notes with these marks, in Exhibit 27, page 443.
a An exception to proposition 1, relative to diphtheria, page 452.
b An exception to proposition 2, relative to diphtheria, page 452.

RELATIONS OF TONSILITIS TO METEOROLOGICAL CONDITIONS.

In 1879, Tonsilitis, compared with other diseases, ranked 9 in order of prevalence, as shown in Exhibit 24, page 436. Its prevalence by months is shown in Exhibit 26, page 440, and is graphically represented in Diagram 2, page 456. Its curve may profitably be compared with that representing pneumonia in

Diagram 1, page 441, and with the line of × × × ×'s in Diagram No. VIII., page 348, representing the average night ozone, for several stations in Michigan.

EXHIBIT 31.—TONSILITIS.—*Per Cent of Weekly Reports of Diseases in Michigan, Stating Presence of Tonsilitis, during the Year and during each Month of the Year 1879, Compared with some given Meteorological Conditions at the same time, as observed at the office of State Board of Health, Lansing, Michigan, which is near the center of the thickly-settled part of the State.**

Months in Order of Per Cent of Weekly Reports Stating Presence of Tonsilitis.†		Per Cent of Weekly Reports Stating Presence of Tonsilitis.†	Av. Order of Prevalence where Present. †, ‡	Temperature. Degrees Fahr.			Humidity of Atmosphere.		Vapor Inhaled and Exhaled.		Ozone,—Relative.		Average Velocity of Wind, Miles per Hour,—By Registering Anemometer. ††	Pressure of Atmosphere. Inches of Mercury. (Reduced to 32° F)		
				Av. Range.			Av. of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily.				Scale of 10 Degrees of Coloration.			Range of Barometer.		
				Of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily.	During Day and Following Night, by Registering Thermometers,—Observed at 7 A. M.	Average of Daily Observations at 7 A. M., 2 P. M., and 9 P. M.	Relative Humidity, or Per Cent of Saturation.	Absolute Humidity,—Grs. of Vapor in a Cubic foot of Air. §	Ounces (Troy) of Vapor Inhaled by One Person in 24 hours.‖	Ounces (Troy) of Vapor Exhaled from Air Passages in 24 Hours, in Excess of Vapor Inhaled.¶	Day Observation,—7 A. M. to 2 P. M.	Night Observation,—9 P. M. to 7 A. M.		Monthly and for Year.	Av. Daily Range of Observations at 7 A. M., 2 P. M., and 9 P. M.	Average Pressure.
Year 1879		45	4.5	------	**115	49.14	70	3.44	2.15	9.53	3.15	3.58	‡‡9.7	1.230	.132	29.045
More than Av. Per Ct. of Tonsilitis.	Mar.	60	4.5	[a]11.04	[a]18.10	36.27	72	2.07	1.29	10.39	3.79	4.50	12.4	[a] .820	.152	[a] 29.015
	Feb.	60	4.1	[a] 9.96	[a]17.64	22.49	85	1.40	0.88	10.80	3.41	4.77	------	.915	.147	29.045
	Dec.	60	3.9	[a] 8.39	[a]15.03	27.46	80	1.65	1.03	10.65	[a] 2.97	3.87	11.3	.983	.207	[a] 29.034
	Jan.	54	3.9	[a]10.84	[a]18.04	25.03	80	1.48	0.93	10.75	3.36	3.87	------	[a] .861	.181	29.057
	April	52	4.6	16.27	24.22	47.54	[a]60	2.75	1.72	9.96	[a] 2.62	[a] 2.80	[a] 9.6	.952	[a] .104	[a] 29.004
	Nov.	52	4.3	[a]11.23	[a]16.77	38.22	75	2.45	1.53	10.15	3.53	4.63	12.2	1.078	.199	[a] 29.029
Average		45	4 5	13.61	20.83	[c] 49.14	70	[c] 3.44	2.15	9.53	3.15	3.58	‡‡ 9.7	.872	.132	29.045
Less than Av. Per Ct. of Tonsilitis.	May	41	4.2	[a]16.81	[a]27.96	60.88	59	4.19	2.62	9.06	2.69	2.80	7.4	.798	.109	[a] 29.085
	Oct.	43	4.7	[a]14.00	20.16	59.50	68	4.58	2.86	8.82	2.73	3.52	[a] 10.2	[a]1.200	.124	[a] 29.115
	June	43	4.4	[a]15.10	[a]21.87	67.71	66	5.18	3.24	8.44	1.97	2.60	6.8	[a] .914	.111	29.016
	Sept.	32	5.4	[a]15.80	[a]22.27	58.11	70	4.19	2.62	9.06	[a] 3.17	3.50	[a] 10.0	.858	.097	[a] 29.106
	July.	28	5.3	[a]16.00	[a]22.87	75.86	61	6.10	3.81	7.87	[a] 3.81	3.56	8.6	.634	.089	28.998
	Aug.	28	5.7	[a]17.90	[a]24.97	70.65	62	5.26	3.29	8.39	[a] 3.74	2.48	8.4	.454	.067	29.030

*, †, ‡, §, ‖, ¶, **, ††, ‡‡, §§. See foot-notes with these marks, in Exhibit 27, page 443.

[a] An exception to proposition 1, relative to tonsilitis, pages 454-5.

[c] For 1879 there is no exception to proposition 2, relative to tonsilitis, page 455. Tonsilitis and Neuralgia were not printed on all the postal blanks used during the year 1879, and were printed on a somewhat smaller proportion of those used during the early part of the year. It is therefore possible that they were not uniformly reported throughout the year, and that the evidence in Exhibit 31 is not as conclusive as it would be had these diseases been printed on all the blanks used.

PROPOSITION 1.—That more than the average per cent of weekly reports stated the presence of Tonsilitis in months when the average daily range of temperature, the relative humidity of the atmosphere, the ozone, the average velocity of the wind, the monthly and the average daily range of the barometer and the average daily pressure of the atmosphere, were greater than the average for the year; and less than the average per cent of reports stated the presence of Tonsilitis in months when these conditions were less than the average for the year. In Exhibit 31, page 454, the letter *a* marks exceptions to this proposition for the year 1879.

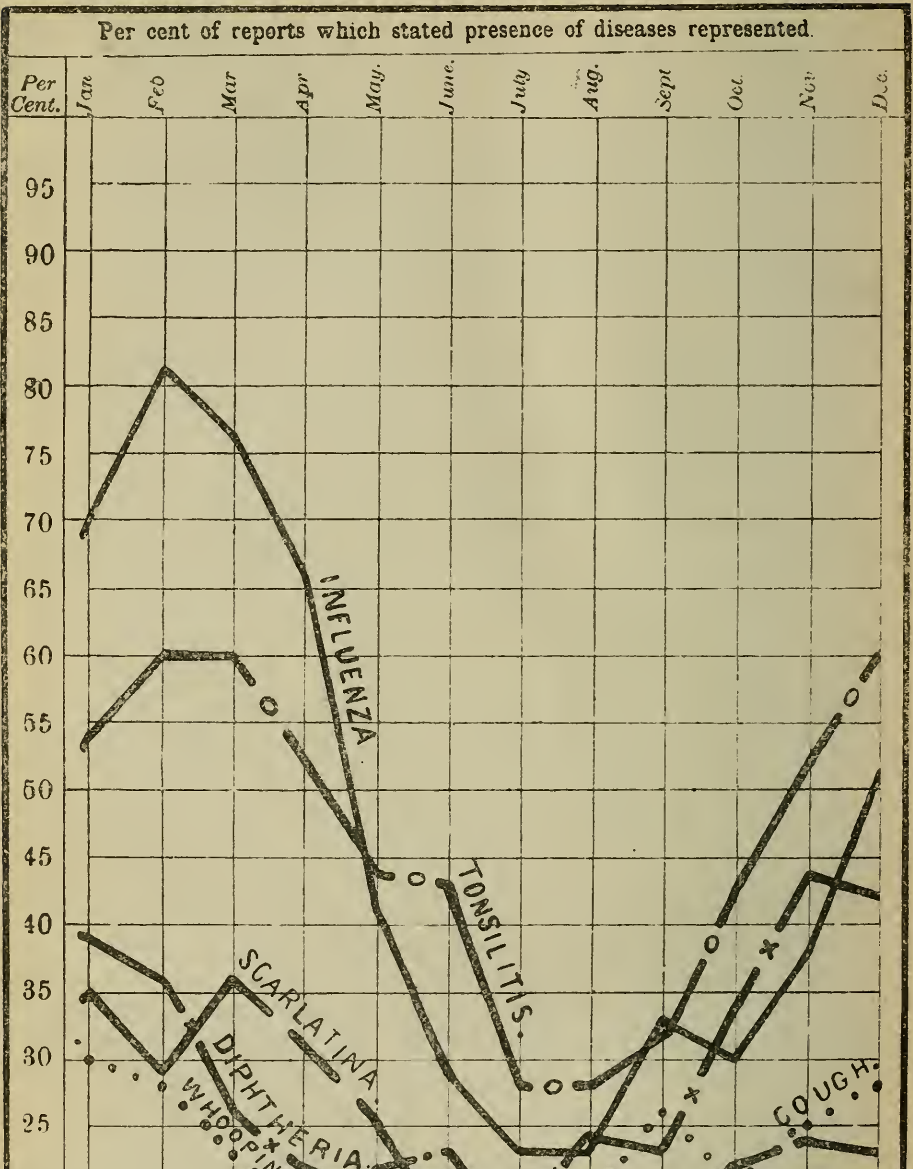
PROPOSITION 2.—That more than the average per cent of weekly reports stated the presence of Tonsilitis in months when the average daily temperature and the absolute humidity of the atmosphere were less that the average for the year; and less than the average per cent of reports stated the presence of Tonsilitis in months when these conditions were greater than the average for the year. In exhibit 31, page 454, there is no exception to this proposition for the year 1879.

EXHIBIT 32.—INFLUENZA.—*Per Cent of Weekly Reports of Diseases in Michigan, Stating Presence of Influenza, during the Year and during each Month of the Year 1879, Compared with some given Meteorological Conditions at the same time, as Observed at the Office of the State Board of Health, Lansing, Michigan, which is near the center of the thickly-settled part of the State.**

MONTHS IN ORDER OF PER CENT OF WEEKLY REPORTS STATING PRESENCE OF INFLUENZA.†		Per Cent of Weekly Reports Stating Presence of Influenza.†	Average Order of Prevalence where Present.†, ‡	TEMPERATURE, Degrees Fahr.			HUMIDITY OF ATMOSPHERE. Av. of Observations, at 7 A. M., 2 P. M., and 9 P. M., Daily.		VAPOR INHALED AND EXHALED.		OZONE,—RELATIVE. Scale of 10 Degrees of Coloration.		Average Velocity of Wind, Miles per Hour,—by Registering Anemometer.††	PRESSURE OF ATMOSPHERE. Inches of Mercury. (Reduced to 32° F.)		
				AV. RANGE.		Average of Daily Observations at 7 A. M., 2 P. M., and 9 P. M.	Relative Humidity or Per Cent of Saturation.	Absolute Humidity,—Grains of Vapor in a Cubic Foot of Air.§	Ounces (Troy) of Vapor Inhaled by one Person in 24 Hours.‖	Ounces (Troy) of Vapor Exhaled from Air Passages in 24 Hours, in Excess of Vapor Inhaled.¶	Day Observation,—7 A. M. to 9 P. M.	Night Observation,—9 P. M. to 7 A. M.		RANGE OF BAROMETER.		Average Pressure.
				Of Observation at 7 A. M., 2 P. M., and 9 P. M., Daily.	During Day and following Night, by Registering Thermometers,—Observed at 7 A. M.									Monthly, and for Year.	Average Daily Range of Observations at 7 A. M., 2 P. M., and 9 P. M.	
Year 1879..		45	3.1	......	**115	49.14	70	3.44	2.15	9.53	3.15	3.58	‡‡ 9.7	1.230	.132	29.045
More than Av. Per Cent of Influenza.	Feb..	81	1.9	*a* 9.96	*a*17.64	22.49	85	1.40	0.88	10.80	3.41	4.77	......	.915	.147	29.045
	Mar..	76	1.9	*a*11.04	*a*18.10	36.27	72	2.07	1.29	10.39	3.79	4.50	12.4	*a* .820	.152	*a* 29.015
	Jan..	70	2.1	*a*10.84	*a*18.04	25.03	80	1.48	0.93	10.75	3.36	3.87	......	*a* .861	.181	29.057
	Apr..	66	2.4	16.27	24.22	47.54	*a* 60	2.75	1.72	9.96	*a* 2.62	*a* 2.80	*a* 9.6	.952	*a* .104	*a* 29.004
	Dec..	51	2.7	*a* 8.39	*a*15.03	27.46	80	1.65	1.03	10.65	*a* 2.97	3.87	11.3	.983	.207	*a* 29.034
Average ..		45	3.1	13.61	20.83	49.14	70	3.44	2.15	9.53	3.15	3.58	‡‡ 9.7	.872	.132	29.045
Less than Average Per Cent of Influenza.	May..	41	3.2	*a*16.81	*a*27.96	60.88	59	4.19	2.62	9.06	2.69	2.80	7.4	.798	.109	*a* 29.085
	Nov..	38	3.7	11.23	16.77	*b*38.22	*a* 75	*b* 2.45	1.53	10.15	*a* 3.53	*a* 4.63	*a* 12.2	*a*1.078	*a* .199	29.029
	Sept.	33	3.8	*a*15.80	*a*22.27	58.11	70	4.19	2.62	9.06	*a* 3.17	3.50	*a* 10.0	8.58	.097	*a* 29.106
	Oct...	30	4.0	*a*14.00	20.16	59.50	68	4.58	2.86	8.82	2.73	3.52	*a* 10.2	*a*1.200	.124	*a* 29.115
	June	29	4.0	*a*15.10	*a*21.87	67.71	66	5.18	3.24	8.44	1.97	2.60	6.8	*a* .911	.111	29.016
	July.	23	5.2	*a*16.00	*a*22.87	75.86	61	6.10	3.81	7.87	*a* 3.81	3.56	8.6	.634	.089	28.998
	Aug..	23	5.9	*a*17.90	*a*24.97	70.65	62	5.26	3.29	8.39	*a* 3.74	2.48	8.4	.454	.067	29.030

*, †, ‡, §, ‖, ¶, **, ††, ‡‡. See foot-notes, with these marks, in Exhibit 27, page 443.
a An exception to proposition 1, relative to influenza, page 457.
b An exception to proposition 2, relative to influenza, page 457.

DIAGRAM 2.—WEEKLY REPORTS OF DISEASES IN MICHIGAN, IN 1879.



Designed by Henry B Baker.

RELATIONS OF INFLUENZA TO METEOROLOGICAL CONDITIONS.

PROPOSITION 1.—That more than the average per cent of weekly reports stated the presence of influenza in months when the Average Daily Range of Temperature, the Relative Humidity of the Atmosphere, the Ozone, the Average Velocity of the Wind, the Monthly and the Average Daily Range of the Barometer, and the Average Daily Pressure of the Atmosphere were greater than the average for the year, and less than the average per cent of reports stated the presence of influenza in months when these conditions were less than the average for the year. In Exhibit 32, page 455, the letter *a* marks exceptions to this proposition for the year 1879.

PROPOSITION 2.—That more than the average per cent of weekly reports stated the presence of influenza in months when the Average Daily Temperature and the Absolute Humidity of the Atmosphere were less than the average for the year, and less than the average per cent of reports stated the presence of influenza in months when these conditions were greater than the average for the year. In Exhibit 32, page 455, the letter *b* marks exceptions to this proposition for the year 1879.

In 1879 influenza caused a very considerable amount of sickness in Michigan. According to Exhibit 24, page 436, it was the fifth disease in order of prevalence. By Diagram 2, page 456, it will be seen that the disease has very strongly-marked relations to meteorological conditions, shown in Diagrams No. I., page 316, No. III., page 327, and No. VIII., page 348. By comparing its curve in Diagram 2, page 456, with those in Diagram 1, page 441, it may be seen that it is closely related to bronchitis, pneumonia, and other diseases which prevail when the air is cold, dry, and contains an excess of ozone.

INFLUENZA,—SPECIAL REPORTS, DESCRIPTION AND CAUSATION.

In January, February, and March,* 1879, a severe form of influenza prevailed quite extensively in Michigan, and probably throughout the Northern States. Concerning this epidemic some evidence is given in this article on Weekly Reports of Diseases in Michigan in 1879, and some in the article on the Diseases in Michigan in 1879, based on reports after the close of the year, and printed on pages 221–262 of this Report. In order to bring together the evidence so far as practicable, special reports of this epidemic follow herewith:

INFLUENZA AT MANCHESTER, MICH., REPORTED BY THE HEALTH OFFICER.

There has been for the past few weeks a somewhat peculiar form of catarrhal disease or "influenza," prevailing in this community. In the surrounding towns of Brooklyn, Napoleon, and Grass Lake [Jackson Co.], diphtheria has prevailed to some extent the present winter; and about the last of December and in the first part of January last, a few cases occurred in this village and township, only one proving fatal. Commencing at that time, however, and continuing to the present, there have been very many cases of a disease which is so uniform in its character, and so universal in its attacks, that I think it may truly be called epidemic. Up to the present writing fully one-third of the people in this vicinity have suffered from it. It usually, or at least many times, attacks one member of a family first, and the others all speedily follow; or perhaps all are taken simultaneously, and usually without their knowing how or when they have "taken cold."

I will describe a typical case. Patient complains first of a feeling of soreness, stiffness, or aching of the whole body, followed within a short time by sneezing, then by *soreness* of throat (almost universal), with redness of the pharynx, swelling of the tonsils, more or less fever, and a hoarse spasmodic cough. These symptoms are less marked in the morning, and grow decidedly worse near evening. Of course the symptoms and cases vary much in severity, some cases passing on into bronchial fever, others into pneumonia, while others recover rapidly. Some of the patients ask medical advice, fearing they have diphtheria, while some think they have whooping-cough. The peculiarity of this epidemic, consists in the *universal* pharyngitis, the inflammation extending down into the trachea and large bronchi, and also affecting the œsophagus, and in the daily remission in the morning and exacerbation in the evening.

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*See Diagram 2, page 456.

Of course this disease is not fatal nor particularly dangerous, but the interest connected with it consists in studying the cause. Is it the same which, in different degree or conditions, produces scarlatina and diphtheria? Is it contagious, infectious, epidemic or endemic in its nature and origin? Does it depend on temperature, moisture, or any other climatic condition?

The temperature has been steadily severe through the month of December, and to the latter part of January, the thermometer going down to -12° F. a number of times, but for the past 12 days it has not been below 0, and still the same disease *has not abated.* Very respectfully yours,

A. C. TAYLOR, M. D.,

Manchester, Washtenaw Co., Mich., Feb. 7, 1879. *Health Officer of Township of Manchester.*

INFLUENZA AT SPRINGWELLS, WAYNE CO., MICH.,—REPORTED BY B. R. HOYT, M. D., HEALTH OFFICER.

We have had in this locality a disease called by some, influenza. This disease broke out in this locality February 1, and continues to date. I have had three deaths,—one an old lady 82 years old, with bronchial symptoms; 2. An old man, age 63, bronchial symptoms; 3. A child, 3 months old, bronchial symptoms. In all the cases that have come under my observation I have found they begin with a chill followed by fever. Ten per cent of the cases have periodical pain, of a neuralgic form, 5th pair of nerves. Catarrhal symptoms are prominent in many cases. Free discharge of mucus from the nose. Nervous symptoms are very prominent in many cases. Children have developed bronchitis in connection with the disease. In the three cases that were fatal, I attributed death to pulmonary congestion. The fever is sometimes so violent as to cause delirium. The highest temperature I have recorded is 105°. I have found albumen in the urine in some cases generally urine scanty, bowels constipated. In this disease of gastro-intestinal symptoms, bronchial symptoms, neuralgia of the 5th pair of nerves all respond to the same treatment, quinia and stimulants. Yours, truly,

Springwells, Wayne Co., Mich., March 18, 1879. B. R. HOYT.

INFLUENZA AT THE STATE PUBLIC SCHOOL, COLDWATER, REPORTED BY LYMAN P. ALDEN, SUPT.

We had a remarkable epidemic of colds, croup, and sore throats about Feb. 4 to Feb. 12. It struck us like a wave, and scarcely a child or employee escaped. The same was true of multitudes in the town and country about here. What was peculiar about it was that our children and employees had almost entirely escaped colds, croups, etc., through all the wet, sloppy weather of the fall, and through all the intense cold of winter. The weather was comparatively mild and pleasant about the 4th to the 12th of Feb., and the ground comparatively dry.

During the past week we have had a similar epidemic, but I can account for it by the sloppy condition of the grounds and the dampness of the air. This also prevails all about here. Aside from this, we have excellent health and have not had a case of pneumonia this Winter. Truly yours,

State Public School, Coldwater, Mich., March 10, 1879. L. P. ALDEN.

INFLUENZA AT CEDAR TOWNSHIP, OSCEOLA CO.,—REPORTED BY THE HEALTH OFFICER.

There are three cases of mild form of diphtheria now, and those are getting well. Bad colds is now prevailing in our township at this time. Yours truly, JACOB THOMAS,

Ashton, Osceola Co., Mich., Feb. 10, 1879. *Supervisor and Health Officer of Cedar Township.*

PNEUMONIA AT MENOMINEE, MICH.,—REPORTED BY REV. A. W. BILL.

During January a form of pneumonia prevailed among the children here, and in some cases was fatal. One physician thought faint symptoms of cerebro-spinal meningitis obtained in some cases. The air was remarkably cold and dry during first half of month. Children were coming down rapidly when a light fall of snow at once checked the disease, and now I hear of no new cases.

Menominee, Menominee Co., Mich, Feb 7, 1879. Respectfully, A. W. BILL.

INFLUENZA, ETC., IN MARION TOWNSHIP, SANILAC CO.—REPORTED BY G. C. VINCENT, M. D., HEALTH OFFICER.

An epidemic is raging in this and adjoining townships. It starts like a common cold, and rapidly takes on a variety of symptoms, and varies with different individuals. Catarrh, pneumonia, rheumatism, gout, and dispepsia are the more prominent symptoms. Any explanation or suggestion from you will be thankfully received. A mild type of measles now exists in this and adjoining townships also. Yours truly,

Deckersville, Sanilac Co., Feb. 11, 1879. G. C. VINCENT, M. D.,

Health Officer for Marion Township, Sanilac Co.

The following report of this epidemic is taken from a paper read by J. H. Carstens, M. D., of Detroit, before the Detroit Medical and Library Association, Feb. 3, 1879, and published in the "Transactions" of that Association for April, 1879, pp. 9–10:—

"A new disease has swept over our city, which came none know where from. I call it a new disease, as I cannot find any description of such an epidemic in any of the text-books, nor has any physician been able to tell me the name. It is certainly not the 'influenza' or epizootic which spread over the land a few years ago, attacking man and beast; the symptoms are different. The patient will generally first complain of a sore throat; by inspection we find an erythematous blush on the pharynx and soft palate, extending down the larynx to the bronchial tubes. This redness often commences on one side and extends to the whole mucous lining of the throat. No difficulty in swallowing is experienced, only a slight pain with tickling and constant desire to cough. The lymphatics of the neck are enlarged, but the patient calls especial attention to a stiffness in the trapezius and muscles of the back of the neck. Accompanying this are neuralgic pains around the shoulder and running down the arm, generally only on one (the left) side, sudden sharp colic-like pains in bowels, of short duration but frequently recurring; the bowels sometimes loose, most frequently constipated; anorexia and nausea; fleeting pains in the joints, slight bronchitis, probably caused by the extension of the throat trouble; headache slight, general malaise, in fact the patient complains of great prostration. To these symptoms are added a fever of malarial character, generally worse at night. This almost always subsides in two days, even without treatment; temperature rising in my cases not over 101 degrees.

"Some of the above symptoms are absent in some cases, but the constant distressing cough and throat trouble, never. Many cases got well without treatment or by the use of household remedies, but some would linger along and only improved, even after other medication had been tried, after the use of a good dose of quinine, say 25 grains in the course of a day. Cases under my own treatment I would generally give quinine first and then a cough mixture with 5 grains each of chloride of ammonium and iodide of potassium. With this treatment the symptoms subsided in a few days.

"The disease made its appearance at the beginning of the month and has continued to make itself felt until the present time, although it now seems to have died out.

"Now, what is it? It might be of a malarial origin, that subtle poison, which in its protean forms modifies all the diseases in this part of the State. It may be a modification of the diphtheritic poison or of scarlatina or of erysipelas, or it may be merely caused by the intense cold which has been unusual and of long duration. To me it has, however, seemed to be contagious, as one or two members of a family would be attacked first, and in five or six days other members. In some instances the parents would be first affected, in others the school children. The disorder attacked all alike, never respecting social position, race, nationality, age or sex. Many patients have called my attention to its contagiousness. Considering it therefore a contagious disease, propagated by transferring a poison from one person to another, the question naturally arises, what is the poison?" *

In the discussion which followed—

"Dr. Lauderdale thought the extreme cold and sudden changes in temperature sufficient to account for the prevalence of sore throat.

"Dr. Reynolds had been disposed to look upon the sore throat, which was so prevalent, as a mild form of influenza.

"Dr. Warner had seen considerable influenza, with tendency to neuralgia, but considered it much the same as usual at this season.

"Dr. McGraw was inclined to believe that all these diseases came together, though perhaps with some slight change in character, and that they were dependent upon climatic changes." †

A comparison of the diagrams in the article on "Meteorology of Michigan in 1879," with those in this article on "Weekly Reports of Diseases," seems to prove that Prof. McGraw was right in his belief that the diseases reported as influenza, tonsilitis, bronchitis, and pneumonia are dependent upon climatic conditions. This does not prove that they are or are not communicable from person to person, but only that their causation or spread is dependent upon such conditions as temperature, humidity, ozone, and wind. Just how closely these diseases are related to the velocity of the wind cannot be as well shown in this Report ‡ as it is hoped to do in the next Report, though enough has been shown in this and the preceding Report to show that the relations are remarkably close.

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* J. H. Carstens, M. D., in "Transactions of the Detroit Medical and Library Association" for April, 1879, proceedings of meeting of Feb. 3, 1879, pp. 9-10.

† Transactions of the Detroit Medical and Library Association, April, 1879, page 10.

‡ Permission could not at first be obtained to put the anemometer on the new Capitol, so that the record of the wind is incomplete for the year 1879, but for ten months of the year it is well shown on page 351 of this Report.

RELATIONS OF RHEUMATISM TO METEOROLOGICAL CONDITIONS.

PROPOSITION 1.—That **more** than the average per cent of weekly reports stated the presence of Rheumatism in months when the Average Daily Range of Temperature, the Relative Humidity of the Atmosphere, the Ozone, the Average Velocity of the Wind, the Monthly and the Average Daily Range of the Barometer, and the Average Daily Pressure of the Atmosphere were **greater** than the average for the year; and **less** than the average per cent of reports stated the presence of Rheumatism in months when these conditions were **less** than the average for the year. In Exibit 33, below, the letter *a* marks exceptions to this proposition for the year 1879. The per cent of weekly reports stating presence of rheumatism in 1879 is graphically represented in Diagram 4, page 469.

EXHIBIT 33.—RHEUMATISM.—*Per Cent of Weekly Reports of Diseases in Michigan, Stating Presence of Rheumatism, during the Year and during each month of the Year 1879, Compared with some given Meteorological Conditions at the same time, as observed at the office of the State Board of Health, Lansing, Michigan, which is near the center of the thickly-settled part of the State.**

Months in Order of Per Cent of Weekly Reports Stating Presence of Rheumatism.†		Per Cent of Weekly Reports Stating Presence of Rheumatism.†	Average Order of Prevalence when Present. †, ‡	Temperature, Degrees Fahr.			Humidity of Atmosphere. Av. of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily.		Vapor Inhaled and Exhaled.		Ozone,—Relative. Scale of 10 Degrees of Coloration.		Average Velocity of Wind, Miles per Hour,—By Registering Anemometer.††	Pressure of Atmosphere. Inches of Mercury. (Reduced to 32° F.)		
				Range.										Range of Barometer.		
				Of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily.	During Day and following Night, by Registering Thermometers, Observed at 7 A. M.	Average of Daily Observations at 7 A. M., 2 P. M., and 9 P. M.	Relative Humidity, or Per Cent of Saturation.	Absolute Humidity—Grains of Vapor in a Cubic Foot of Air.§	Ounces (Troy) of Vapor Inhaled by one Person in 24 Hours.‖	Ounces (Troy) of Vapor Exhaled from Air Passages in 24 Hours, in Excess of Vapor Inhaled.¶	Day Observation,—7 A. M. to 2 P. M.	Night Observation,—9 P. M. to 7 A. M.		Monthly, and for Year.	Average Daily Range of Observations at 7 A. M., 2 P. M., and 9 P. M.	Average Pressure.
Year 1879		72	4.6	------	** 115	49.14	70	3.44	2.15	9.53	3.15	3.58	‡‡9.7	1.230	.132	29.045
More than Average Per Cent of Rheumatism.	April	81	4.0	16.27	24.22	47.54	*a* 60	2.75	1.72	9.96	*a* 2.62	*a* 2.80	*a* 9.6	.952	*a* .104	*a* 29.004
	Jan.	80	4.3	*a*10.84	*a*18.04	25.03	80	1.48	0.93	10.75	3.36	3.87	------	*a* .861	.181	29.057
	Mar.	79	4.4	*a*11.04	*a*18.10	36.27	72	2.07	1.29	10.39	3.79	4.50	12.4	*a* .820	.152	*a* 29.015
	Feb.	78	4.5	*a* 9.96	*a*17.64	22.49	85	1.40	0.88	10.80	3.41	4.77	------	.915	.147	29.045
	May.	75	4.2	16.81	27.96	*b*60.88	*a* 59	*b* 4.19	2.62	9.06	*a* 2.69	*a* 2.80	*a* 7.4	*a* .798	*a* .109	29.085
	Nov.	75	4.7	*a*11.23	*a*16.77	38.22	75	2.45	1.53	10.15	3.53	4.63	12.2	1.078	.199	*a* 29.029
	Dec.	74	4.4	*a* 8.39	*a*15.03	27.46	80	1.65	1.03	10.65	*a* 2.97	3.87	11.3	.983	.207	*a* 29.034
Average		72	4.6	13.61	20.83	49.14	70	3.44	2.15	9.53	3.15	3.58	‡‡9.7	.872	.132	29.045
Less than Av. Per Cent.	June	71	4.1	*a*15.10	*a*21.87	67.71	66	5.18	3.24	8.44	1.97	2.60	6.8	*a* .914	.111	29.016
	Oct.	70	4.6	*a*14.00	20.16	59.50	68	4.58	2.86	8.82	2.73	3.52	*a* 10.2	*a*1.200	.124	*a* 29.115
	Sept.	66	5.2	*a*15.80	*a*22.27	58.11	70	4.19	2.62	9.06	*a* 3.17	3.50	*a* 10.0	.858	.097	*a* 29.106
	July.	65	5.0	*a*16.00	*a*22.87	75.86	61	6.10	3.81	7.87	*a* 3.81	3.56	8.6	.634	.089	28.998
	Aug.	57	5.8	*a*17.90	*a*24.97	70.65	62	5.26	3.29	8.39	*a* 3.74	2.48	8.4	.454	.067	29.030

*, †, ‡, §, ‖, ¶, **, ††, ‡‡. See foot-notes with these marks, in Exhibit 27, page 443.
a An exception to proposition 1, relative to rheumatism, above.
b An exception to proposition 2, relative to rheumatism, page 461.

PROPOSITION 2.—That more than the average per cent of weekly reports stated the presence of Rheumatism in months when the Average Daily Temperature and the Absolute Humidity of the Atmosphere were less than the average for the year; and less than the average per cent of reports stated the presence of Rheumatism in months when these conditions were greater than the average for the year. In Exhibit 33, page 460, the letter *b* marks exceptions to this proposition for the year 1879.

EXHIBIT 34.—NEURALGIA—*Per Cent of Weekly Reports of Diseases in Michigan, Stating Presence of Neuralgia, during the Year and during each Month of the Year 1879, Compared with some given Meteorological Conditions at the same time, as observed and recorded at the office of the State Board of Health, Lansing, Michigan, which is near the Center of the thickly-settled part of the State.**

MONTHS IN ORDER OF PER CENT OF WEEKLY REPORTS STATING PRESENCE OF NEURALGIA.†		Per Cent of Weekly Reports Stating Presence of Neuralgia.†	Av. Order of Prevalence where Present.†, ‡	TEMPERATURE, Degrees Fahr.			HUMIDITY OF ATMOSPHERE. Av. of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily.		VAPOR INHALED AND EXHALED.		OZONE,—RELATIVE. Scale of 10 Degrees of Coloration.		Av. Velocity of the Wind, Miles per Hour,—by Registering Anemometer.††	PRESSURE OF ATMOSPHERE. Inches of Mercury. (Reduced to 32° F.)		
				RANGE.										RANGE OF BAROMETER.		
				Of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily,	During Day and following Night, by registering Thermometers,—Observed at 7 A. M.	Average of Daily Observations at 7 A. M., 2 P. M., and 9 P. M.	Relative Humidity, or Per Cent of Saturation.	Absolute Humidity—Grs. of Vapor in a Cubic Foot of Air.§	Ounces (Troy) of Vapor Inhaled by one Person in 24 hours.‖	Ounces (Troy) of Vapor Exhaled from Air Passages in 24 Hours, in Excess of Vapor Inhaled.¶	Day Observation,—7 A. M. to 2 P. M.	Night Observation,—9 P. M. to 7 A. M.		Monthly, and for Year.	Av. Daily Range of Observations at 7 A. M., 2 P. M., and 9 P. M.	Average Pressure.
Year 1879..		59	4.5	......	** 115	49.14	70	3.44	2.15	9.53	3.15	3.58	‡‡9.7	1.230	.132	29.045
More than Av. Per Cent of Neuralgia.	Mar..	68	4 5	*a*11.04	*a*18.10	36.27	72	2.07	1.29	10.39	3.79	4.50	12.4	*a*.820	.152	*a*29.015
	Nov..	66	4.1	*a*11.23	*a*16.77	38.22	75	2.45	1.53	10.15	3.53	4.63	12.2	1.078	.199	*a*29.029
	Dec..	66	4.2	*a* 8.39	*a*15.03	27.46	80	1.65	1.03	10.65	*a*2.97	3.87	11.3	.983	.207	*a*29.034
	Apr..	65	4.5	16.27	24.22	47.54	*a*60	2.75	1.72	9.96	*a*2.62	*a*2.80	*a*9.6	.952	*a*.104	*a*29.004
	Oct...	62	4.1	*a*14.00	*a*20.16	*b*59.50	*a*68	*b*4.58	2.86	8.82	*a*2.73	*a*3.52	10.2	1.200	*a*.124	29.115
	June	59	4.1	15.10	21.87	*b*67.71	*a*66	*b*5.18	3.24	8.44	*a*1.97	*a*2.60	*a*6.8	.914	*a*.111	*a*29.016
Average...		59	4.5	13.61	20.83	49.14	70	3.44	2.15	9.53	3.15	3.58	‡‡9.7	.872	.132	29.045
Less than Av. Per Cent of Neuralgia.	Feb..	59	4.5	9.96	17.64	*b*22.49	*a*85	*b*1.40	0.88	10.80	*a*3.41	*a*4.77	......	*a*.915	*a*.147	29.045
	Sept.	56	5.0	*a*15.80	*a*22.27	58.11	70	4.19	2.62	9.06	*a*3.17	3.50	*a*10.0	.858	.097	*a*29.106
	May.	55	4.1	*a*16.81	*a*27.96	60.88	59	4.19	2.62	9.06	2.69	2.80	7.4	.798	.109	*a*29.085
	Aug..	52	5.4	*a*17.90	*a*24.97	70.65	62	5.26	3.29	8.39	*a*3.74	2.48	8.4	.454	.067	29.030
	July.	52	5.0	*a*16.00	*a*22.87	75.86	61	6.10	3.81	7.87	*a*3.81	3.56	8.6	.634	.089	28.998
	Jan...	49	4.9	10.84	18.04	*b*25.03	*a*80	*b*1.48	0.93	10.75	*a*3.36	*a*3.87	......	.861	*a*.181	*a*29.057

*, †, ‡, §, ‖, ¶, **, ††, ‡‡. See footnotes with these marks, in Exhibit 27, page 443.

a An exception to proposition 1, relative to neuralgia, page 462.

b An exception to proposition 2, relative to neuralgia, page 462. Neuralgia and tonsilitis were not printed on all the postal blanks used during the year 1879, and were printed on a smaller proportion of those used in the early part of the year. It is therefore possible that they were not quite uniformly reported throughout the year, and that some months appear exceptional in Exhibit 34 which would not so appear had these diseases been printed on all the blanks used.

RELATIONS OF NEURALGIA TO METEOROLOGICAL CONDITIONS.

PROPOSITION 1.—That **more** than the average per cent of weekly reports stated the presence of Neuralgia in months when the Average Daily range of Temperature, the Relative Humidity of the Atmosphere, the Ozone, the Average Velocity of the Wind, the Monthly and the Average Daily Range of the Barometer, and the Average Daily Pressure of the Atmosphere were **greater** than the average for the year; and **less** than the average per cent of reports stated the presence of Neuralgia in the months when these conditions were **less** than the average for the year. In Exhibit 34, page 461, the letter *a* marks exceptions to this proposition for the year 1879.

PROPOSITION 2.—That **more** than the average per cent of weekly reports stated the presence of Neuralgia in months when the Average Daily Temperature, and the Absolute Humidity of the Atmosphere, were **less** than the average for the year; and **less** than the average per cent of reports stated the presence of Neuralgia in months when these conditions were **greater** than the average for the year. In Exhibit 34, page 461, the letter *b* marks exceptions to this proposition for the year 1879.

The per cent of weekly reports stating presence of neuralgia in 1879 is graphically represented in Diagram 4, page 469.

RELATIONS OF PULMONARY CONSUMPTION TO METEOROLOGICAL CONDITIONS.

PROPOSITION 1. That **more** than the average per cent of weekly reports stated the presence of pulmonary consumption in months when the Average Daily Range of Temperature, the Relative Humidity of the Atmosphere, the Ozone, the Average Velocity of the Wind, the Monthly and the Average Daily Range of the Barometer, and the Average Daily Pressure of the Atmosphere were **greater** than the average for the year; and **less** than the average per cent of the reports stated the presence of pulmonary consumption in months when these conditions were **less** than the average for the year. In Exhibit 35, page 463, the letter *a* marks exceptions to this proposition for the year 1879.

PROPOSITION 2. That **more** than the average per cent of weekly reports stated the presence of pulmonary consumption in months when the Average daily Temperature and the Absolute Humidity of the Atmosphere were **less** than the average for the year; and **less** than the average per cent of reports stated the presence of pulmonary consumption in months when these conditions were **greater** than the average for the year. In Exhibit 35, page 463, the letter *b* marks exceptions to this proposition for the year 1879.

The per cent of weekly reports of diseases stating presence of pulmonary consumption in 1879 is graphically represented in Diagram 4, page 469.

RELATIONS OF DIARRHEA TO METEOROLOGICAL CONDITIONS.

PROPOSITION 1.—That **more** than the average per cent of weekly reports stated the presence of Diarrhea in months when the Average Daily Range of Temperature, the Average Daily Temperature, the Absolute Humidity of the Atmosphere, the Monthly and the Average Daily Range of the Barometer, and the Average Daily Pressure of the Atmosphere were **greater** than the average for the year; and **less** than the average per cent of reports stated the presence of Diarrhea in months when these conditions were **less** than the average for the year. In Exhibit 36, page 464, the letter *a* marks exceptions to this proposition for the year 1879. For those months which are not exceptions to this proposition as relates to Diarrhea, Cholera Infantum, and Intermittent Fever (Exhibits 36–8, pages 464–7), and as regards the Absolute Humidity

EXHIBIT 35.—CONSUMPTION.—*Per Cent of Weekly Reports of Diseases in Michigan, Stating Presence of Pulmonary Consumption during the Year and during each Month of the Year 1879, Compared with some given Meteorological Conditions at the same time, as observed and recorded at the Office of the State Board of Health, Lansing, Michigan, which is near the center of the thickly-settled part of the State.**

Months in Order of Per Cent of Weekly Reports Stating Presence of Consumption.†		Per Cent of Weekly Reports Stating Presence of Consumption.†	Av. Order of Prevalence where Present. †, ‡	Temperature Degrees Fahr.			Humidity of Atmosphere. Av. of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily.		Vapor Inhaled and Exhaled.		Ozone,—Relative. Scale of 10 degrees of Coloration.		Av. Velocity of the Wind, Miles per Hour,—By Registering Anemometer.††	Pressure of Atmosphere. Inches of Mercury. (Reduced to 32° F.)		
				Range.		Average of Daily Observations at 7 A. M., 2 P. M., and 9 P. M.								Range of Barometer.		Average Pressure.
				Of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily.	During Day and Following Night, by Registering Thermometers,—Obs'v'd at 7 A. M.		Relative Humidity, or Per Cent of Saturation.	Absolute Humidity—Grs. of Vapor in a Cubic ft. of Air.§	Ounces (Troy) of Vapor Inhaled by one Person in 24 hours.‖	Ounces (Troy) of Vapor Exhaled from Air Passages in 24 Hours, in Excess of Vapor Inhaled.¶	Day Observation,—7 A. M. to 2 P. M.	Night Observation,—9 P. M. to 7 A. M.		Monthly, and for Year.	Av. Daily Range of Observations at 7 A. M., 2 P. M., and 9 P. M.	
YEAR 1879		70	5.6	------	**115	49.14	70	3.44	2.15	9.53	3.15	3.58	‡‡ 9.7	1.230	.132	29.045
More than Av. Per Ct. of Consumption.	April	77	5.5	16.27	24.22	47.54	*a* 60	2.75	1.72	9.96	*a* 2.62	*a* 2.80	*a* 9.6	.952	*a* .104	*a*29.004
	May	74	5.2	16.81	27.96	*b*60.88	*a* 59	*b* 4.19	2.62	9.06	*a* 2.69	*a* 2.80	*a* 7.4	*a* .798	*a* .109	29.085
	June	73	5.0	15.10	21.87	*b*67.71	*a* 66	*b* 5.18	3.24	8.44	*a* 1.97	*a* 2.60	*a* 6.8	.914	*a* .111	*a*29.016
	Jan.	71	5.7	*a*10.84	*a*18.04	25.03	80	1.48	0.93	10.75	3.36	3.87	------	*a* .861	.181	29.057
	Feb.	71	5.9	*a* 9.96	*a*17.64	22.49	85	1.40	0.88	10.80	3.41	4.77	------	.915	.147	29.045
Average		70	5.6	13.61	20.83	49.14	70	3.44	2.15	9.53	3.15	3.58	‡‡ 9.7	.872	.132	29.045
Less than Av. Per Cent. of Consumption.	July	69	5.6	*a*16.00	*a*22.87	75.86	61	6.10	3.81	7.87	*a* 3.81	3.56	8.6	.634	.089	28.998
	Oct.	69	5.4	*a*14.00	20.16	59.50	68	4.58	2.86	8.82	2.73	3.52	*a* 10.2	*a*1.200	.124	*a*29.115
	Mar.	69	6.0	11.04	18.10	*b*36.27	*a* 72	*b* 2.07	1.29	10.39	*a* 3.79	*a* 4.50	*a* 12.4	.820	*a* .152	29.015
	Sept.	67	6.0	*a*15.80	*a*22.27	58.11	70	4.19	2.62	9.06	*a* 3.17	3.50	*a* 10.0	.858	.097	*a*29.106
	Aug.	67	6.2	*a*17.90	*a*24.97	70.65	62	5.26	3.29	8.39	*a* 3.74	2.48	8.4	.454	.067	29.030
	Nov.	67	5.4	11.23	16.77	*b*38.22	*a* 75	*b* 2.45	1.53	10.15	*a* 3.53	*a*4.63	*a* 12.2	*a*1.078	*a* .199	29.029
	Dec.	64	5.8	8.39	15.03	*b*27.46	*a* 80	*b* 1.65	1.03	10.65	2.97	*a* 3.87	*a* 11.3	*a* .983	*a* .207	29.034

*, †, ‡, §, ‖, ¶, **, ††, ‡‡. See foot-notes with these marks, in Exhibit 27, page 443.
a An exception to proposition 1, relative to consumption, page 462.
b An exception to proposition 2, relative to consumption, page 462.

of the Atmosphere, the proposition is true also that the quantity of vapor inhaled daily was **greater** than the average, and the quantity exhaled daily in excess of that inhaled was **less** than the average, in months when **more** than the average per cent of reports stated presence of these diseases; and that **less** vapor was inhaled and a **greater** excess exhaled daily in months when the per cent of reports stating presence of these diseases was less than the average.

PROPOSITION 2. That **more** than the average per cent of weekly reports stated the presence of Diarrhea in months when the Relative Humidity of the Atmosphere, the Ozone, and the Average Velocity of the Wind were **less** than the average for the year; and **less** than the average per cent of reports stated the presence of Diarrhea in months when these conditions were **greater** than the average for the year. In Exhibit 36, page 464, the letter *b* marks exceptions to this proposition for the year 1879.

What per cent of all the weekly reports of sickness received in 1879 stated presence of Diarrhea is graphically represented by months in Diagram 1, p. 441.

EXHIBIT 36.—DIARRHEA.—*Per Cent of Weekly Reports of Diseases in Michigan, Stating Presence of Diarrhea during the Year and during each Month of the Year 1879, Compared with some given Meteorological Conditions at the same time, as observed at the Office of the State Board of Health, Lansing, Michigan, which is near the center of the thickly-settled part of the State.**

Months in Order of Per Cent of Weekly Reports Stating Presence of Diarrhea.†		Per Cent of Weekly Reports Stating Presence of Diarrhea.†	Average Order of Prevalence where Present. †, ‡	Temperature. Degrees Fahr. Range. Av. Daily and for Year.		Temperature.	Humidity of Atmosphere. Av. of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily.		Vapor Inhaled and Exhaled.		Ozone—Relative. Scale of 10 Degrees of Coloration.		Average Velocity of Wind, Miles per Hour,—By Registering Anemometer. ††	Pressure of Atmosphere. Inches of Mercury. (Reduced to 32° F.) Range of Barometer.		Pressure of Atmosphere.
				Of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily.	During Day and following Night, by Registering Thermometers,—Observed at 7 A. M.	Average of Daily Observations at 7 A. M., 2 P. M., and 9 P. M.	Relative Humidity, or Per Cent of Saturation.	Absolute Humidity,—Grains of Vapor in a Cubic Foot of Air. §	Ounces (Troy) of Vapor Inhaled by one Person in 24 Hours.‖	Ounces (Troy) of Vapor Exhaled from Air Passages in 24 Hours, in Excess of Vapor Inhaled.¶	Day Observation,—7 A. M. to 2 P. M.	Night Observation,—9 P. M. to 7 A. M.		Monthly, and for Year.	Average Daily Range of Observations at 7 A. M., 2 P. M. and 9 P. M.	Average Pressure.
Year 1879..		48	4.4	------	**115	49.14	70	3.44	2.15	9.53	3.15	3.58	‡‡9.7	1.230	.132	29.045
More than Av. Per Cent.	Aug..	93	2.5	17.90	24.97	70.65	62	5.26	3.29	8.39	*b* 3.74	2.48	8.4	*a* .454	*a* .067	*a* 29.030
	Sept.	83	3.2	15.80	22.27	58.11	70	4.19	2.62	9.06	*b* 3.17	3.50	*b* 10.0	*a* .858	*a* .097	29.106
	July.	77	3.1	16.00	22.87	75.86	61	6.10	3.81	7.87	*b* 3.81	3.56	8.6	*a* .634	*a* .089	*a* 28.998
	Oct. .	58	3.9	14.00	*a*20.16	59.50	68	4.58	2.86	8.82	2.73	3.52	*b* 10.2	1.200	*a* .124	29.115
Average...		48	4.4	13.61	20.83	49.14	70	3.44	2.15	9.53	3.15	3.58	‡‡9.7	.872	.132	29.045
Less than Average Per Cent of Diarrhea.	June	44	4.7	*a*15.10	*a*21.87	*a*67.71	*b* 66	*a* 5.18	3.24	8.44	*b* 1.97	*b* 2.60	*b* 6.8	*a* .914	.111	29.016
	Nov..	40	5.5	11.23	16.77	38.22	75	2.45	1.53	10.15	3.53	4.63	12.2	*a*1.078	*a* .199	29.029
	May .	31	6.0	*a*16.81	*a*27.96	*a*60.88	*b* 59	*a* 4.19	2.62	9.06	*b* 2.69	*b* 2.80	*b* 7.4	.798	.109	*a* 29.085
	April	30	6.6	*a*16.27	*a*24.22	47.54	*b* 60	2.75	1.72	9.96	*b* 2.62	*b* 2.80	*b* 9.6	*a* .952	.104	29.004
	Dec..	30	5.8	8.39	15.03	27.46	80	1.65	1.03	10.65	*b* 2.97	3.87	11.3	*a* .983	*a* .207	29.034
	Mar..	25	7.1	11.04	18.10	36.27	72	2.07	1.29	10.39	3.79	4.50	12.4	.820	*a* .152	29.015
	Feb. .	21	6.5	9.96	17.64	22.49	85	1.40	0.88	10.80	3.41	4.77	------	*a* .915	*a* .147	29.045
	Jan...	20	6.8	10.84	18.04	25.03	80	1.48	0.93	10.75	3.36	3.87	------	.861	*a* .181	*a* 29.057

*, †, ‡, §, ‖, ¶, **, ††, ‡‡. See foot-notes, with these marks, in Exhibit 27, page 443.
a An exception to proposition 1, relative to diarrhea, pages 462–3.
b An exception to proposition 2, relative to diarrhea, page 463.

RELATIONS OF CHOLERA INFANTUM TO METEOROLOGICAL CONDITIONS.

PROPOSITION 1. That more than the average per cent of weekly reports stated the presence of Cholera Infantum in months when the Average Daily Range of Temperature, the Average Daily Temperature, the Absolute Humidity of the Atmosphere, the Monthly and the Average Daily Range of the Barometer, and the Average Daily Pressure of the Atmosphere were greater than the average for the year; and less than the average per cent of reports stated the presence of Cholera Infantum in months when these conditions were less than the average for the year. In Exhibit 37, below, the letter *a* marks exceptions to this proposition for the year 1879.

PROPOSITION 2. That **more** than the average per cent of weekly reports stated the presence of Cholera Infantum in months when the Relative Humidity of the Atmosphere, the Ozone, and the Average Velocity of the Wind were **less** than the average for the year, and **less** than the the average per cent of reports stated the presence of Cholera Infantum in months when these conditions were **greater** than the average for the year. In Exhibit 37, below, the letter *b* marks exceptions to this proposition for the year 1879.

What per cent of all the weekly reports of sickness received in 1879 stated presence of Cholera Infantum is graphically represented in Diagram 1, p. 441.

EXHIBIT 37.—CHOLERA INFANTUM.—*Per Cent of Weekly Reports of Diseases in Michigan, Stating Presence of Cholera Infantum during the Year and during each Month of the Year 1879, Compared with some given Meteorological Conditions at the same time, as Observed and Recorded at the Office of the State Board of Health, Lansing, Michigan, which is near the center of the thickly-settled part of the State.**

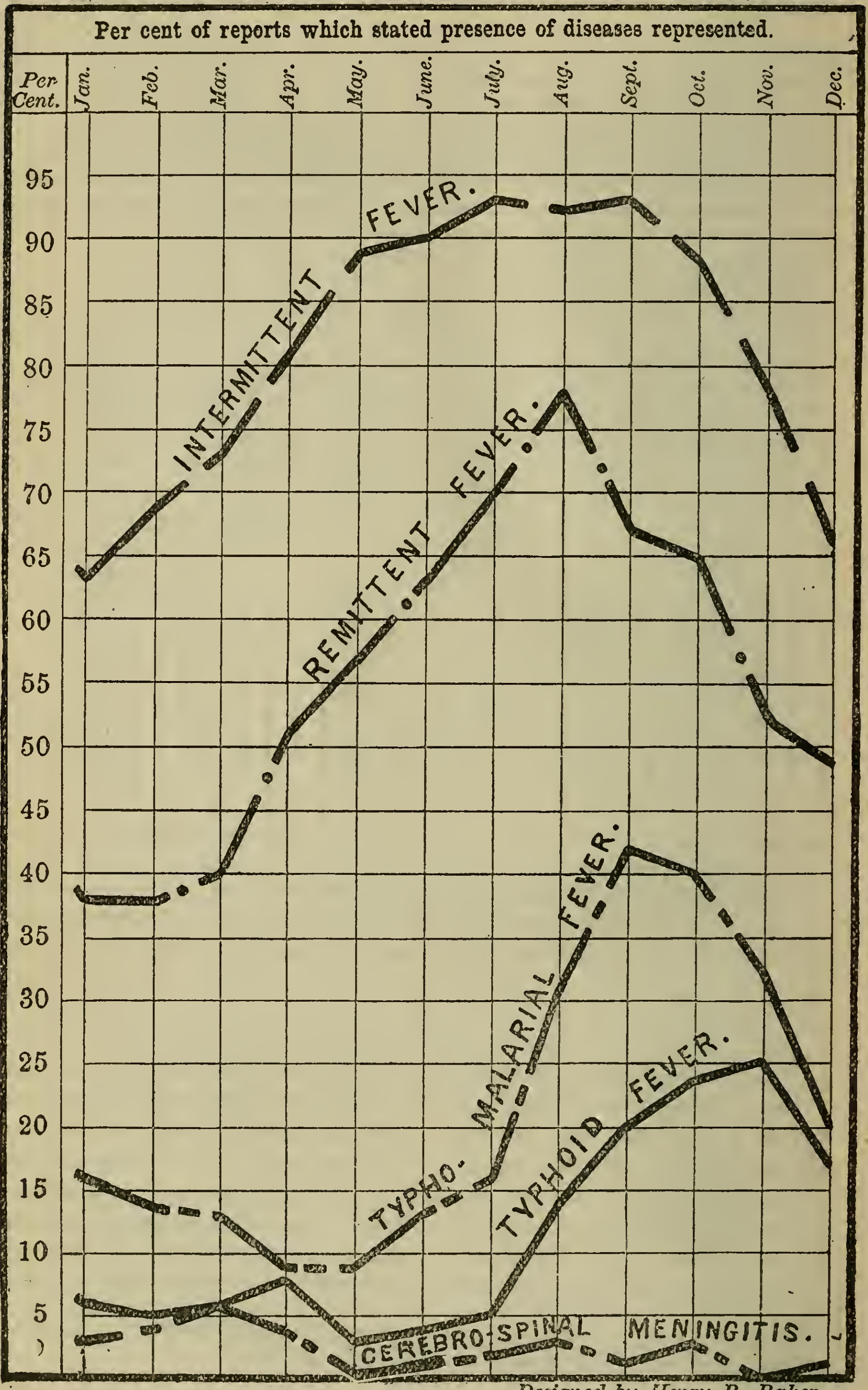
MONTHS IN ORDER OF PER CENT OF WEEKLY REPORTS STATING PRESENCE OF CHOLERA INFANTUM. †		Per Cent of Weekly Reports Stating Presence of Cholera Infantum.†	Average Order of Prevalence where Present.†,‡	TEMPERATURE. Degrees Fahr.			HUMIDITY OF ATMOSPHERE. Av. of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily.		VAPOR INHALED AND EXHALED.		OZONE,—RELATIVE. Scale of 10 Degrees of Coloration.		Average Velocity of Wind, Miles per Hour,—by Registering Anemometer.††	PRESSURE OF ATMOSPHERE. Inches of Mercury. (Reduced to 32° F.)		
				RANGE.		Average of Daily Observations at 7 A. M., 2 P. M., and 9 P. M.	Relative Humidity, or Per Cent of Saturation.	Absolute Humidity,—Grs. of Vapor in a Cubic ft. of Air.§	Ounces (Troy) of Vapor Inhaled by one Person in 24 Hours.‖	Ounces (Troy) of Vapor Exhaled from Air Passages in 24 Hours, in excess of Vapor Inhaled.¶	Day Observation,—7 A. M. to 2 P. M.	Night Observation,—9 P. M. to 7 A. M.		RANGE OF BAROMETER.		Average Pressure.
				Of Observations at 7 A. M., 2 P. M., and 9 P. M. Daily.	During Day and Following Night, by Registering Thermometers,—Obs'v'd at 7 A. M.									Monthly, and for Year.	Average Daily Range of Observations at 7 A. M., 2 P. M., and 9 P. M.	
Year 1879...		14	5.4	......	**115	49.14	70	3.44	2.15	9.53	3.15	3.58	‡‡9.7	1.230	.132	29.045
More than Av. Per Ct.	Aug...	57	5.3	17.90	24.97	70.65	62	5.26	3.29	8.39	*b*3.74	2.48	8.4	*a* .454	*a* .067	*a* 29.030
	July..	35	4.8	16.00	22.87	75.86	61	6.10	3.81	7.87	*b*3.81	3.56	8.6	*a* .634	*a* .089	*a* 28.998
	Sept..	31	5.7	15.80	22.27	58.11	70	4.19	2.62	9.06	*b*3.17	3.50	*b*10.0	*a* .858	*a* .097	29.106
Average....		14	5.4	13.61	20.83	49.14	70	3.44	2.15	9.53	3.15	3.58	‡‡ 9.7	.872	.132	29.045
Less than Av. Per Cent of Cholera Infantum.	Oct...	8	4.8	*a*14.00	20.16	*a*59.50	*b*68	*a*4.58	2.86	8.82	*b*2.73	*b*3.52	10.2	*a*1.200	.124	*a* 29.115
	June..	5	6.1	*a*15.10	*a*21.87	*a*67.71	*b*66	*a*5.18	3.24	8.44	*b*1.97	*b*2.60	*b* 6.8	*a* .914	.111	29.016
	Nov. .	4	4.1	11.23	16.77	38.22	75	2.45	1.53	10.15	3.53	4.63	12.2	*a*1.078	*a* .199	29.029
	Mar. .	4	6.4	11.04	18.10	36.27	72	2.07	1.29	10.39	3.79	4.50	12.4	.820	*a* .152	29.015
	Feb...	2	7.0	9.96	17.64	22.49	85	1.40	0.88	10.80	3.41	4.77	......	*a* .915	*a* .147	29.045
	Jan...	2	7.3	10.84	18.04	25.03	80	1.48	0.93	10.75	3.36	3.87	......	.861	*a* .181	*a* 29.057
	April.	2	8.3	*a*16.27	*a*24.22	47.54	*b*60	2.75	1.72	9.96	*b*2.62	*b*2.80	*b*9.6	*a* .952	.104	29.004
	Dec...	1	4.5	8.39	15.03	27.46	80	1.65	1.03	10.65	*b*2.97	3.87	11.3	*a* .983	*a* .207	29.034
	May..	0.4	10.0	*a*16.81	*a*27.96	*a*60.88	*b*59	*a*4.19	2.62	9.06	*b*2.69	*b*2.80	; *b*7.4	.798	.109	*a*29.085

*, †, ‡, §, ‖, ¶, **, ††, ‡‡. See foot-notes with these marks, in Exhibit 27, page 443.

a An exception to proposition 1, relative to cholera infantum, page 464.

b An exception to proposition 2, relative to cholera infantum, above.

DIAGRAM 3.—WEEKLY REPORTS OF DISEASES IN MICHIGAN, IN 1879.



Designed by Henry B. Baker.

RELATIONS OF INTERMITTENT FEVER TO METEOROLOGICAL CONDITIONS.

PROPOSITION 1.—That more than the average per cent of weekly reports stated the presence of Intermittent Fever in months when the Average Daily Range of Temperature, the Average Daily Temperature, the Absolute Humidity of the Atmosphere, the Monthly and the Average Daily Range of the Barometer, and the Average Daily Pressure of the Atmosphere, were greater than the average for the year; and less than the average per cent of reports stated the presence of Intermittent Fever in months when these conditions were less

EXHIBIT 38.—INTERMITTENT FEVER.—*Per Cent of Weekly Reports of Diseases in Michigan, Stating Presence of Intermittent Fever, during the Year and during each Month of the Year 1879, Compared with some given Meteorological Conditions existing at the same time, as observed at the office of the State Board of Health, Lansing, Michigan, which is near the center of the thickly-settled part of the State.**

Months in Order of Per Cent of Weekly Reports Stating Presence of Intermittent Fever.†		Per Cent of Weekly Reports Stating Presence of Intermittent Fever.†	Av. Order of Prevalence where Present. †, ‡	Temperature. Degrees Fahr.			Humidity of Atmosphere. Av. of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily.		Vapor Inhaled and Exhaled.		Ozone,—Relative. Scale of 10 Degrees of Coloration.		Average Velocity of Wind, Miles per Hour,—By Registering Anemometer. ††	Pressure of Atmosphere. Inches of Mercury. (Reduced to 32° F.)		
				Av. Range.		Average of Daily Observations at 7 A. M., 2 P. M., and 9 P. M.	Relative Humidity, or Per Cent of Saturation.	Absolute Humidity,—Grs. of Vapor in a Cubic foot of Air. §	Ounces (Troy) of Vapor Inhaled by One Person in 24 hours.‖	Ounces (Troy) of Vapor Exhaled from Air Passages in 24 Hours, in Excess of Vapor Inhaled.¶	Day Observation,—7 A. M. to 2 P. M.	Night Observation,—9 P. M. to 7 A. M.		Range of Barometer.		Average Pressure.
				Of Observations at 7 A. M., 2 P. M., and 9 P. M., Daily.	During Day and Following Night, by Registering Thermometers,—Observed at 7 A. M.									Monthly and for Year.	Av. Daily Range of Observations at 7 A. M., 2 P. M., and 9 P. M.	
Year 1879..		82	2.2	......	**115	49.14	70	3.44	2.15	9.53	3.15	3.58	‡‡9.7	1.230	.132	29.045
More than Av. Per Ct. of Intermittent Fever.	July.	93	1.5	16.00	22.87	75.86	61	6.10	3.81	7.87	*b* 3.81	3.56	8.6	*a* .634	*a* .089	*a* 28.998
	Sept.	93	1.7	15.80	22.27	58.11	70	4.19	2.62	9.06	*b* 3.17	3.50	*b* 10.0	*a* .858	*a* .097	29.106
	Aug.	92	1.8	17.90	24.97	70.65	62	5.26	3.29	8.39	*b* 3.74	2.48	8.4	*a* .454	*a* .067	*a* 29.030
	June	90	1.4	15.10	21.87	67.71	66	5.18	3.24	8.44	1.97	2.60	6.8	.914	*a* .111	*a* 29.016
	May.	89	1.9	16.81	27.96	60.88	59	4.19	2.62	9.06	2.69	2.80	7.4	*a* .798	*a* .109	29.085
	Oct...	88	1.6	14.00	*a*20.16	59.50	68	4.58	2.86	8.82	2.73	3.52	*b* 10.2	1.200	*a* .124	29.115
Average ..		82	2.2	13.61	20.83	c 49.14	70	c 3.44	2.15	9.53	3.15	3.58	‡‡ 9.7	.872	.132	29.045
Less than Av. Per Ct. of Intermittent Fever.	April	81	2.6	*a*16.27	*a*24.22	47.54	*b* 60	2.75	1.72	9.96	*b* 2.62	*b* 2.80	*b* 9.6	*a* .952	.104	29.004
	Nov..	78	2.4	11.23	16.77	38.22	75	2.45	1.53	10.15	3.53	4.63	12.2	*a*1.078	*a* .199	29.029
	Mar..	73	3.5	11.04	18.10	36.27	72	2.07	1.29	10.39	3.79	4.50	12.4	.820	*a* .152	29.015
	Feb..	69	3.9	9.96	17.64	22.49	85	1.40	0.88	10.80	3.41	4.77	......	*a* .915	*a* .147	29.045
	Dec..	66	2.8	8.39	15.03	27.46	80	1.65	1.03	10.65	*b* 2.97	3.87	11.3	*a* .983	*a* .207	29.034
	Jan..	63	3.4	10.84	18.04	25.03	80	1.48	0.93	10.75	3.36	3.87	......	.861	*a* .181	*a* 29.057

*, †, ‡, §, ‖, ¶, **, ††, ‡‡. See foot-notes with these marks, in Exhibit 27, page 443.

a An exception to proposition 1, relative to intermittent fever, above.

b An exception to proposition 2, relative to intermittent fever, page 468.

c As regards Average Temperature and Absolute Humidity, there is no exception to proposition 1, relative to intermittent fever, above.

than the average for the year. In exhibit 38, page 467, the letter *a* marks exceptions to this proposition for the year 1879. As regards the Average Daily Temperature and the Absolute Humidity of the Atmosphere, there is for 1879 no exception to this proposition.

In this Report, a very interesting comparison is for the first time made possible and convenient, by means of diagrams showing by months in 1879 the curve for intermittent fever in Michigan and for average range of temperature for six stations in the State. By comparing the uppermost line in Diagram 3, page 466, with the line of × × × ×'s, which is the average line in Diagram II., page 320, the reader will see that the correspondence is quite marked. By Exhibit 38, page 467, it may also be seen that the foregoing proposition (1, pages 467–8), relative to intermittent fever and range of temperature held true in ten out of the twelve months.

Other remarks on the subject of intermittent fever and range of temperature are printed on page 318 of this Report. As shown on pages 435–6, intermittent fever is reported to have caused more sickness in this State in 1879 than did any other disease, and this is also indicated in Diagram 3; it is therefore important that its causes and modes of prevention be learned as early as possible.

PROPOSITION 2.—That **more** than the average per cent of weekly reports stated the presence of Intermittent Fever in months when the Relative Humidity of the Atmosphere, the Ozone, and the Average Velocity of the Wind were **less** than the average for the year; and **less** than the average per cent of reports stated the presence of Intermittent fever in months when these conditions were **greater** than the average for the year. In Exhibit 38, page 467, the letter *b* marks exceptions to this proposition for the year 1879.

REMITTENT FEVER.

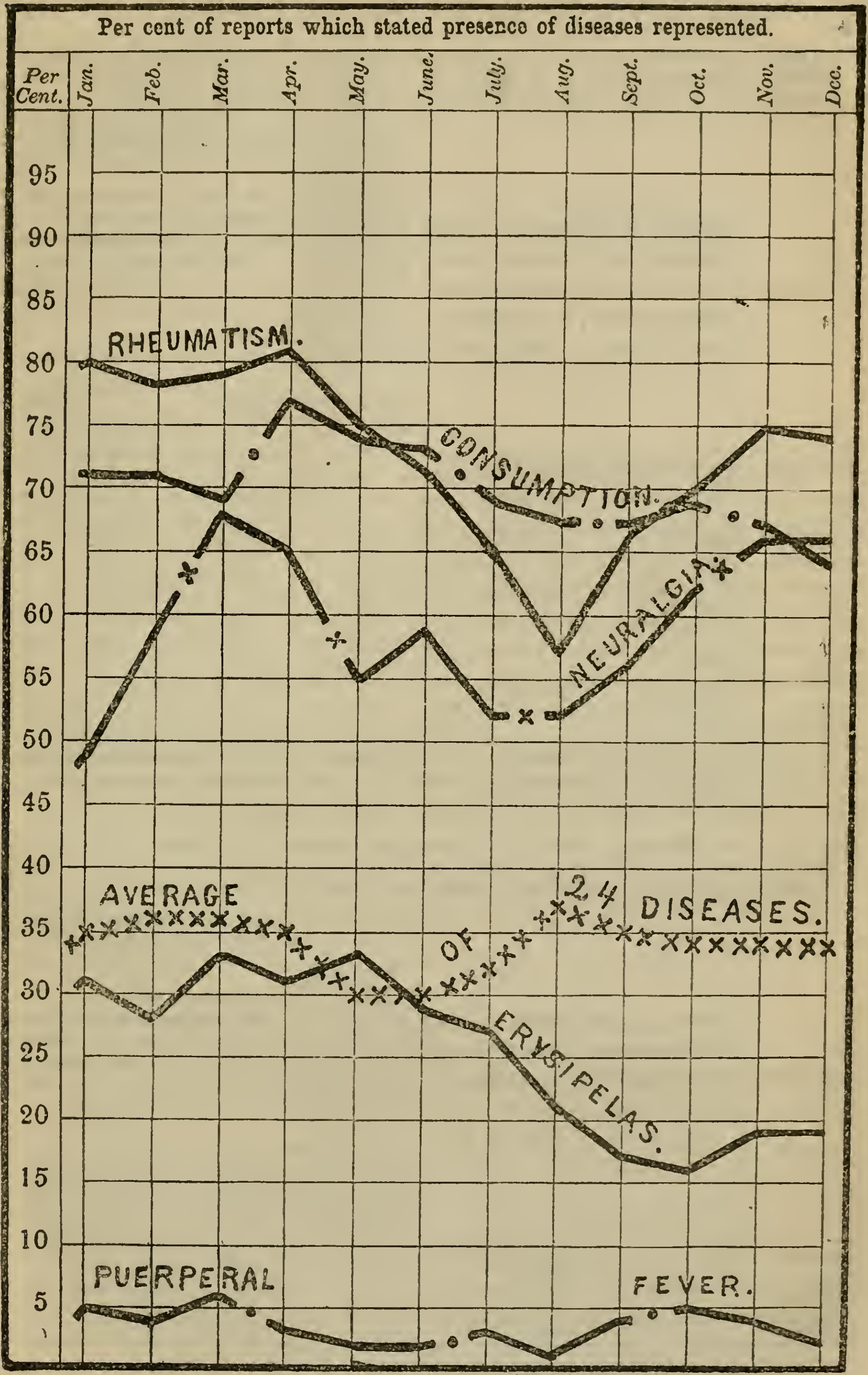
Whoever will compare the line representing remittent fever in Diagram 3, page 466, with the line of × × × ×'s in Diagram VIII., page 348, representing the average night ozone, will find the remarkable uniformity with which the remittent fever line corresponds with the night ozone line when inverted. It seems that the least ozone is coincident with the most sickness from remittent fever.

The per cent of reports stating presence of each of the diseases represented in Diagrams 1, 2, 3, and 4, is numerically stated in Exhibit 26, page 440; also, in connection with other statements concerning the same diseases, on pages 376–9, of Table 2; and for 12 of the leading diseases it is stated in connection with statements of coincident meteorological conditions in Exhibits 27–38, pages 443–67. A study of three of the diseases represented on Diagram 4, Rheumatism, Neuralgia, and Consumption, in connection with coincident meteorological conditions, by months in 1879, is given in Exhibits 33–5, pages 460–3. As inflammation of the brain and inflammation of the bowels were not printed on any cards issued before July 1, 1879, and not on all used after that date, and as for this reason they probably were not so fully reported when they occurred as were the other diseases, they are not represented on the diagrams, or included in the summary statements of Tables 1, 2, and 4.

Table 1, of the Weekly Reports of Diseases, pages 372–3, and Exhibit 4, from the replies by correspondents to circular 38, pages 234–5, should be studied each in connection with the other.

In Diagram 4, the line of × × × ×'s representing the rise and fall of the average of sickness from 24 of the most important diseases, by months in 1879, shows that May and June were the most healthful months, and August was the most unhealthful.

DIAGRAM 4—WEEKLY REPORTS OF DISEASES IN MICHIGAN, IN 1879.



Designed by Henry B. Baker.

EXHIBIT 39.—*Summary relative to Propositions contained in Exhibits 27–35 (pages 443–63), concerning Relations, by Months in 1879, between Greater or Less than usual Prevalence of Diseases named and certain given coincident Climatic Conditions.*

DISEASES.	MONTHS IN WHICH DISEASES NAMED WERE MORE THAN USUALLY PREVALENT, IN 1879.	MONTHS IN WHICH DISEASES NAMED WERE LESS THAN USUALLY PREVALENT, IN 1879.	FOR THE 12 MONTHS OF THE YEAR 1879, NUMBER OF MONTHS IN WHICH PROPOSITIONS HOLD TRUE.					
			That Diseases named were More Prevalent than usual when the Av. Temp. and Absolute Humidity were Lower than usual, and Less Prevalent when these conditions were Higher than usual.		That Diseases named were More Prevalent than usual when the Relative Humidity, Ozone, and Velocity of Wind were Greater than usual, and Less Prevalent than usual when these conditions were Lower than usual.			
			For Average Temperature.	For Absolute Humidity.	For Relative Humidity.	FOR OZONE.		For Velocity of Wind.*
						Day.	Night.	
Bronchitis	Jan. to May, Nov., Dec.	June to Oct.	11	11	10	6	10	6*
Pneumonia	Jan. to Apr., Dec.	May to Nov.	11	11	10	8	10	6*
Membraneous Croup.	Jan. to Apr., Nov., Dec.	May to Oct.	12	12	11	7	11	7*
Diphtheria	Jan., Feb., Oct., Nov., Dec.	Mar. to Sept.	9	9	10	6	10	8*
Tonsilitis	Jan. to Apr., Nov., Dec.	May to Oct.	12	12	11	7	11	7*
Influenza	Jan. to Apr., Dec.	May to Nov.	11	11	10	6	10	6*
Rheumatism	Jan. to May, Nov., Dec.	June to Oct.	11	11	10	6	10	6*
Neuralgia	Mar., Apr., June, Oct. to Dec.	Jan., Feb., May, July to Sept.	8	8	7	3	7	7*
Pulmonary Consumpt'n.	Jan., Feb., Apr. to June.	Mar., July to Dec.	7	7	6	4	6	2*

How closely related to climatic conditions were several of the cold-weather diseases is shown in the summary—Exhibit 39; and a similar summary relating to some of the warm-weather diseases is given in Exhibit 40.

EXHIBIT 40.—*Summary relative to Propositions contained in Exhibits 36–8 (pages 464–7), concerning Relations, by Months in 1879, between Greater or Less than Usual Prevalence of Diseases named and certain given coincident Climatic Conditions.*

DISEASES.	MONTHS IN WHICH DISEASES NAMED WERE MORE THAN USUALLY PREVALENT, IN 1879.	MONTHS IN WHICH DISEASES NAMED WERE LESS THAN USUALLY PREVALENT, IN 1879.	FOR THE 12 MONTHS OF THE YEAR 1879, NUMBER OF MONTHS IN WHICH PROPOSITIONS HOLD TRUE.					
			That Diseases named were More Prevalent than usual when the Av. Temp. and Absolute Humidity were Higher than usual, and Less Prevalent when these conditions were Lower than usual.		That Diseases named were More Prevalent than Usual when Relative Humidity, Ozone, and Velocity of Wind were Less than Usual, and Less Prevalent when these conditions were Greater than Usual.			
			For Average Temperature.	For Absolute Humidity.	For Relative Humidity.	FOR OZONE.		For Velocity of Wind.*
						Day.	Night.	
Diarrhea	July to Oct.	Jan. to June, Nov., Dec.	10	10	9	5	9	5*
Cholera Infantum.	July to Sept.	Jan. to June, Oct. to Dec.	9	9	8	4	8	6*
Intermittent Fever.	May to Oct.	Jan. to Apr., Nov., Dec.	12	12	11	7	11	7*

* The observations on velocity of wind were made but for the ten months, March to December.

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ERRATA.

Page viii, line *may the work*, insert *a* before *whole*.

Page liv, in the date of letter by Dr. Mont Cassiday, for *1880* read *1879*.

Page 91, fifteenth line from bottom, for *official* read *officinal*.

Page 111, twenty-first line, for *Van Dusen* read *Van Deusen*.

Page 161, ninth line of last paragraph, for *is* read *if*.

Page 193, third line of first paragraph, for *Crudeti* read *Crudeli*.

Page 229, first column of Exhibit 2, next to last line, and page 241, first column of Exhibit 6, next to last line, for *Plymouth* read *Northville*.

Page 306, Exhibit 7, first column, for *D. T. Waters* read *D. P. Waters*.

Page 335, Table VI., first column, line *Av. for 23 Stations* read *Av. for 19 Stations*.

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